Soil Mechanics

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Report No A8017

BARNSLEY MARKETS, PHASE 2

FACTUAL REPORT ON GROUND INVESTIGATION

Carried out for : 1249 Regeneration Partnership LLP

Engineer : Wardell Armstrong LLP

Date : May 2008

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BARNSLEY MARKETS, PHASE 2
FACTUAL REPORT ON GROUND INVESTIGATION

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1 INTRODUCTION

During February 2008 Soil Mechanics (SM) were commissioned by Wardell Armstrong (WA), on behalf of 1249 Regeneration Partnership LLP, to carry out a ground investigation at Barnsley Markets, Barnsley, South Yorkshire. The investigation was required to obtain geotechnical information for a proposed redevelopment of the site.

The scope of the investigation, which was specified by WA, comprised cable percussion and rotary drilled boreholes, windowless sampling, in situ testing and laboratory testing. The investigation was carried out in accordance with the contract specification and relevant standards (see References). The fieldwork was carried out between 25 February 2008 and 11 April 2008.

This report presents the factual records of the fieldwork and laboratory testing. The data is also presented separately in digital format following AGS (2005).

2 THE SITE AND GEOLOGY

2.1 The Site

The site is situated within the town centre of Barnsley, see Site Location Plan in Enclosure F. The site is centred at National Grid reference SK 347 065.

2.2 Published Geology

The published geological map covering the site, GS Sheet 87 (1976) shows the underlying bedrock to be Middle Coal Measures of Upper Carboniferous age. No information on superficial deposits are shown on the map.

3 FIELDWORK

3.1 General

The fieldwork was carried out in general accordance with BS EN 1997-2 (2007) and its related standards together with the relevant section of BS 5930 (1999).

The exploratory hole locations were selected by WA. The locations were set out from local features.

3.2 Exploratory Holes

The exploratory holes are listed in the following table.

SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Cable Percussion Boring	4	4.82	
Cable Percussion Boring extended by Rotary Core Drilling/Open Hole Drilling	10	39.35	
Rotary Core Drilling/Open Hole Drilling	9	34.10	
Windowless Sampling	48	6.00	

The exploratory hole records are presented in Enclosure A and should be read in conjunction with the Key included therein. The records provide descriptions, where logged by SM, in accordance with BS 5930 (1999), of the materials encountered and details of the samples taken, together with observations made during boring, drilling, and windowless sampling. Photographs of the recovered cores are presented in Enclosure E.

On completion of the fieldwork all geotechnical samples were transported to the Doncaster laboratory of SM for temporary retention and testing. Geoenvironmental samples were retained by WA.

3.3 Instrumentation

The instruments installed in the exploratory holes are shown on the logs and detailed in Enclosure B.

3.4 In Situ Testing

Pressuremeter testing was carried out by Geocone, a specialist department of SM, in general accordance with BS5930 (1999). The factual pressuremeter fieldwork records together with an interpretation of the test results in terms of material parameters are presented in Enclosure C.

Pressuremeter tests were undertaken at locations and depths scheduled by WA, in conjunction with drilling of the boreholes by SM. Details of the pressuremeters used are as follows:

SUMMARY OF PRESSUREMETER EQUIPMENT

Instrument	Nominal Diameter (mm)	Strain Capacity (mm)	Pressure Capacity (MPa)	Instrument Details	Remarks
HPD (High Pressure Dilatometer)	73	12 per arm	20	6 arm multiplex Serial No 940715	Prebored pressuremeter (ie inserted into predrilled test pocket).

The displacement and pressure measuring transducers for the pressuremeter were calibrated prior to the commencement of testing and on completion of the fieldwork. Assessments of the membrane stiffness (ie resistance to inflation in air) were made at the same time and also during the fieldwork where appropriate. The calibration register is contained in the Enclosure C. The testing carried out is summarised in Table 1.

The rotary drilling rig was used to advance the borehole between test locations by conventional rotary coring. The test pockets for each test were drilled using either a TNW core barrel or PDC open hole drilling bit with water or air/mist flush to form a 76 mm diameter section of hole, approximately 2 m long. The HPD was inserted into this test pocket as soon as possible and suspended just off the bottom. The test was then performed.

The tests were carried out in a stress controlled manner using a hand operated oil pump to pressurise the dilatometer at an appropriate loading rate for the ground conditions. During the test at least two unload-reload loops were performed. Before carrying out these loops a holding period was observed to allow creep of the ground to reduce. Loading was continued until either the strain or pressure capacity of the instrument was achieved or if in the operator's opinion continuation would result in risk of damage to the equipment. The pressuremeter was then unloaded.

On completion of each test the pressuremeter was removed and the borehole advanced by rotary methods to the next test location.

Analysis of the collected pressuremeter data was carried out at the Doncaster office of Geocone, using proprietary software developed by Cambridge Insitu. Interpretation of the pressuremeter test data was normally performed on the average values obtained from all the displacement measuring positions (ie the average of the 6 arms) unless one or more displayed inconsistent behaviour.

The pressuremeter tests have been interpreted to provide, where appropriate, estimates of the following parameters:

- in situ cavity pressure by the modified Marsland and Randolph (1977) method
- undrained shear strength after Gibson and Anderson (1961)
- undrained shear modulus determined from the unload-reload loops after Windle and Wroth (1977)
- shear modulus – shear strain relationship (non-linear stiffness response) after Bolton and Whittle (1999)

A brief description of the methods used to interpret the tests is included in the information contained in the Enclosure C.

Graphical plots and tabulations of the results obtained from the analyses are presented in Enclosure C. The results for all the tests are summarised in Table 1.

4 LABORATORY TESTING

The testing was scheduled by WA and was carried out in accordance with BS 1377 (1990) and ISRM (1981 and 1985). The testing is summarised below and the results are presented in Enclosure D.

SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	REMARKS
Moisture Content Determination	
Atterberg Limit Determination	
Particle Size Distribution Analysis	
Unconsolidated Undrained Triaxial Compression Testing	
California Bearing Ratio	
Water Content, Dry Density and Porosity of Rock	
Point Load Index Testing of Rock	
Uniaxial Compressive Strength of Rock	

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	P Hepton BSc PhD
Reviewed By	**J Thompson BA (Hons)**
Approved for Issue By	

REFERENCES

AGS : 2005 : Electronic transfer of geotechnical and geoenvironmental data (Edition 3.1 including addendum May 2005). Association of Geotechnical and Geoenvironmental Specialists.

Bolton M D and Whittle R W : 1999 : A non-linear elastic/perfectly plastic analysis for plane strain undrained expansion tests. *Géotechnique* **49**, No. 1, pp 133-141.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 1999 : Code of practice for site investigations. British Standards Institution.

BS EN ISO 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 - Ground investigation and testing. British Standards Institution.

Gibson R E and Anderson W F : 1961 : In situ measurement of soil properties with the pressuremeter, Civil Engineering and Public Works Review, Vol. 56, No. 658 May pp 6l5-6l8.

GS England and Wales Sheet 87 : 1976 : Barnsley. 1:50000 geological map (solid and drift). Geological Survey of Great Britain.

ISRM : 1981 : Rock Characterisation, Testing and Monitoring - ISRM Suggested Methods (Ed E T Brown). Commission on Testing Methods, International Society for Rock Mechanics, Pergamon Press.

ISRM : 1985 : Suggested method for determining point load strength. Commission on Testing Methods, International Society for Rock Mechanics, International Journal of Rock Mechanics, Mining Sciences and Geomechanics Abstracts, Vol 22.

Marsland A and Randolph M F : l977 : Comparison of the Results from Pressuremeter Tests and Large Insitu Plate Tests in London Clay. *Géotechnique* **27** No. 2 pp 2l7-243.

Windle D and Wroth C P : l977 : The Use of a Self-boring Pressuremeter to determine the Undrained Properties of Clays. *Ground Engineering*, September.

ENCLOSURE A
EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
Borehole Logs	BH201 to 213, 213A, 213B, 214, 215, 215A and 216 to 220
Window Sampler Hole Logs	WS208A, WS221 to 239, 239A, 240 to 243, 243A, 244 to 258, 258A and 259 to 264

Key to Exploratory Hole Records

Soil Mechanics

SAMPLES

Undisturbed

U	Driven tube sample
TW	Pushed thin wall tube sample } nominally 100 mm diameter and full recovery unless otherwise stated
P	Pushed piston sample
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated
CBR	CBR mould sample
BLK	Block sample
CS	Core sample (from rotary core) taken for laboratory testing
AMAL	Amalgamated sample

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3 (2005). The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 (either in total or for a single increment) the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Variable head permeability tests (KFH = falling head test, KRH = rising head test, KPI = packer test), permeability value
	Test results provided in Field Records column

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930 (1999)

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Key to Exploratory Hole Records

Soil Mechanics

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:



SP Standpipe
SPIE Standpipe piezometer
PPIE Pneumatic piezometer
EPIE Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:



ICE Biaxial inclinometer
ICM Inclinometer tubing for use with probe
SLIP Slip indicator

Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

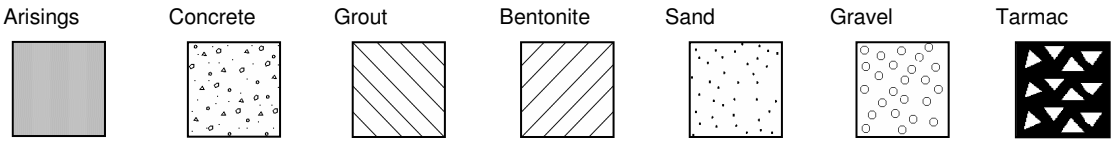
The type of instrument installed is indicated by a code in the Legend column:



ESET Electronic settlement cell/gauge
ETM Magnetic extensometer settlement point
EPCE Electronic embedment pressure cell
PPCE Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends additional to BS5930 are used to describe the backfill materials as indicated below.



NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1 (2002), 14688-2 (2004), 14689-1 (2003) and BS 5930 (1999) as clarified by Baldwin et al (2007).

2 Strata legends are in accordance with BS 5930 (1999).

3 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole (ref BS5930 : 1999, Clause 47.2.7). In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

4 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

5 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

6 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

7 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

Key to Exploratory Hole Records

Soil Mechanics

REFERENCES

Baldwin M, Gosling R C and Brownlie N : 2007 : Soil and rock descriptions - a practical guide to the implementation of BS EN ISO 14688 and 14689. Ground Engineering, July.

BS EN ISO 14688-1 : 2002 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2 : 2004 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 22476-3 : 2005 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

BS 5930 : 1999 : Code of Practice for site investigations. British Standards Institution

Updated July 2007

Borehole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Cable percussion boring	**Depth from** 0.00m **to** 1.60m **Diameter** 150mm **Casing Depth** 1.00m	**Ground Level** +91.88 mOD **Coordinates** E 434661.40 **National Grid** N 406293.80 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50	B 1			
0.80	D 2			
1.00-1.00	SPT S	50 (25 for 2mm/50 for 1mm)	1.00	dry
1.00	ES 1			
1.00-1.03	D 3			
1.00-1.30	B 4			
			07/03/2008	
			1.00	dry
1.60-1.60	SPT C	(25 for 1mm/50 for 0mm)		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE (MADE GROUND)	(0.40) 0.40 *+91.48*		
Very weak thinly laminated grey mottled orange brown MUDSTONE. Recovered as slightly gravelly clay. Gravel is angular to subangular fine to course lithorelict of mudstone.	(1.20)		
EXPLORATORY HOLE ENDS AT 1.60 m	1.60 *+90.28*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.40	Concrete core 200mm.
1.60		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
1.40 -1.60	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Scale 1:50

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Borehole

BH204

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 06/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Cable percussion boring	**Depth from** 0.00m **to** 2.60m **Diameter** 150mm **Casing Depth** 1.20m	**Ground Level** +91.19 mOD **Coordinates** E 434705.50 **National Grid** N 406346.40 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-1.00	B 1			
1.00-1.45	SPT S	N=50 (6,10/10,11,11,18)	1.20	dry
1.00	ES 1			
1.00-1.45	D 2			
1.80	D 3			
2.00	ES 2			
2.30-2.46	SPT S	50 (7,19/50 for 5mm)	1.20	dry
2.30-2.50	D 4		06/03/2008	
			1.20	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE (MADE GROUND)	(0.32) 0.32 *+90.87*		
Very stiff brown mottled grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, coal, sandstone and mudstone. (MADE GROUND)	(0.98)		
Very weak grey mottled orange brown and black MUDSTONE. Recovered as very stiff clay. 1.80 m slightly sandy angular fine to medium gravel of mudstone 2.30 m black coal	1.30 *+89.89* (1.30)		
EXPLORATORY HOLE ENDS AT 2.60 m	2.60 *+88.59*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.32	Concrete core 200mm.
2.50		Cable percussion refusal on hard stratum.

Chiselling

Depths (m)	Time	Tools used
2.50 -2.60	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH209

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Pilcon Cable percussion boring	**Depth from** 0.00m **to** 2.00m **Diameter** 150mm **Casing Depth** 1.00m	**Ground Level** +90.47 mOD **Coordinates** E 434813.30 **National Grid** N 406254.30 **Chainage**	

Samples and Tests

Strata

Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
0.00-1.20	B 1				Very stiff brown and yellow mottled black sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, sandstone and mudstone. (MADE GROUND)	(1.50)		
1.20-1.25	D 2							
						1.50 *+88.97*		
1.80	D 3		04/03/2008 1.20	dry	Very dense yellow and brown slightly gravelly coarse SAND. Gravel is angular to subrounded fine to coarse of sandstone. (MADE GROUND)	(0.50)		
~~2.00-2.00~~	~~SPT S~~	~~(25 for 1mm/50 for 0mm)~~	~~1.20~~	~~dry~~		2.00 *+88.47*		
					EXPLORATORY HOLE ENDS AT 2.00 m			
Depth	**Type & No**	**Records**	**Date Casing**	**Time Water**				

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
2.00		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
1.90 -2.00	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH213B

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Pilcon Cable percussion boring.	**Depth from** 0.00m	**to** 4.82m	**Diameter** 150mm	**Casing Depth** 4.70m

Ground Level +89.73 mOD
Coordinates E 434777.00
National Grid N 406319.20
Chainage

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.20	B 1			
0.80-1.00	ES 1A			
1.20-1.65	SPT S	N=4 (1,1/1,1,1,1)	1.20	dry
1.20-1.65	D 2			
1.20-2.00	B 3			
2.00-2.45	SPT S	N=20 (2,4/4,5,5,6)	1.20	dry
2.00	ES 2A			
2.00-2.45	D 4			
2.00-3.00	B 5			
3.00	ES 3A		3.00	
3.00-3.45	U 6	39 blows		dry
3.50-4.00	B 7			
4.00-4.45	SPT S	N=25 (6,6/6,6,7,6)	4.00	3.90
4.00-4.45	D 8			
4.60	D 9		04/03/2008	
4.80-4.80	SPT C	50 (25 for 1mm/50 for 1mm)	4.70	dry
4.80	D 10			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (Foreman's description) (MADE GROUND)	0.15 *+89.58* (0.30) 0.45 *+89.28*		
Hardcore. (Foreman's description) (MADE GROUND)			
Loose dark grey and brown slightly silty sandy GRAVEL with high cobble content. Gravel is angular to subangular fine to coarse of various lithologies including brick and sandstone. Cobbles of brick. (MADE GROUND)	(1.60)		
Stiff, medium strength, thinly laminated light grey locally mottled orange slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium of mudstone. (MADE GROUND)	2.05 *+87.68* (1.80)		
Medium dense dark grey and brown slightly clayey sandy GRAVEL. Gravel is angular fine to coarse of sandstone, mudstone and brick. Locally mottled black. (MADE GROUND)	3.85 *+85.88* (0.35) 4.20 *+85.53*		
Very weak thinly laminated light grey mottled orange MUDSTONE.	(0.62) 4.82 *+84.91*		
EXPLORATORY HOLE ENDS AT 4.82 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.80	Rose to 3.75 m after 20 minutes.	4.50

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
4.82		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
4.80 -4.80	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole
BH215
Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** BS **Checked** JT	**Start** 10/03/2008 **End** 31/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.60m / 150mm / 1.30m 0.60m / 30.60m / 121mm / 1.30m	**Ground Level** +91.89 mOD **Coordinates** E 434655.60 **National Grid** N 406261.00 **Chainage**	

Samples and Tests

Depth	Type & No	If	Records	Date Casing	Time Water
0.00-0.60	B 1			10/03/2008	
				1.30	dry
				26/03/2008	0800
				1.30	dry
0.80-0.81			SPT S 50 (25 for 6mm/ 50 for 3mm)		
0.80-0.89			D 2		
0.60-1.60	100 85 85	NA			
1.30-1.30			SPT C 50 (25 for 1mm/ 50 for 1mm)		
1.66-1.90			CS 1		
1.60-3.10	100 83 55	60 160 260			
2.37-2.50			CS 2		
				26/03/2008	
				1.30	0.00
				27/03/2008	0800
3.30-3.40			CS 3	1.30	0.30
3.10-4.00	100 56 49				
4.00-4.22			CS 4		
4.00-4.60	100 75 60				
4.60-6.10	87 57 33				
5.52-5.66			CS 5		
6.10-6.80	57 21 14	50 140 220			
6.80-8.00	50 28 10				
8.00-9.10	91 57 0				
				27/03/2008	
				1.30	0.00
				28/03/2008	0800
				1.30	2.30
9.10-10.60	93 47 47	NI 80 80			
Depth	TCR SCR RQD	**If**	**Records/Samples**	**Date Casing**	**Time Water**

Strata

Description	Depth, *Level* (Thickness)
CONCRETE.	0.20 *+91.69*
(MADE GROUND)	0.30 *+91.59*
(Foreman's description)	(0.40)
Hardcore.	0.70 *+91.19*
(MADE GROUND)	
(Foreman's description)	(0.60)
Weak black vitreous COAL.	
Very weak dark grey mottled orange MUDSTONE. 1.30-1.72 m locally grading to firm clay 1.46-1.60 m NI	1.30 *+90.59*
Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough. 2.10-2.20 m firm clay 2.30-2.36 m NI	(1.80)
2.72-2.86 m 1 No. 90 deg undulating rough fracture	
Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, smooth. 3.43-3.48 m 1 No. undulating rough fracture 3.53-3.60 m 1 No. 45 deg undulating rough fracture 3.80-3.86 m 1 No. 45 deg non penetrative planar rough fracture orange discolouration. 3.86-3.93 m 1 No. 90 deg undulating rough fracture 4.40-4.50 m NI 4.90-5.10 m AZCL	3.10 *+88.79* (1.80) 4.90 *+86.99*
Weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, smooth. 6.10-6.40 m AZCL 6.10-8.00 m very weak mudstone, locally grading to hard clay 6.80-7.40 m AZCL	(4.10)
8.10-8.15 m 1 No. 90 deg undulating rough fracture 8.20-8.35 m very weak black siltstone 8.20-8.60 m NI 8.43-8.53 m AZCL 8.60-9.00 m firm locally soft clay 9.00-9.10 m weak black siltstone 9.10-9.20 m AZCL	9.00 *+82.89*
Very weak black vitreous COAL. Fractures are subhorizontal, closely spaced, planar, rough.	(0.80)
9.80-10.60 m locally grading to	9.80 *+82.09*
Stratum continues to 11.10 m	

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.20	Concrete core 200mm.
1.32		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
1.20 -1.30	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH203

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** BS **Checked** JT	**Start** 10/03/2008 **End** 31/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m 0.60m	**to** 0.60m 30.60m	**Diameter** 150mm 121mm	**Casing Depth** 1.30m 1.30m	**Ground Level** +91.89 mOD **Coordinates** E 434655.60 **National Grid** N 406261.00 **Chainage**		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		NI 50 150			
10.83-10.92			CS 6		
11.10-11.40			CS 7		
10.60-12.10	100 65 46				
12.32-12.44		40 110 270	CS 8		
12.10-13.60	100 57 40				
13.80-14.00			CS 9		
13.60-14.70	100 100 75				
15.00-15.20	100		CS 10		
14.70-15.50	100 93				
				28/03/2008 1.30	2.10
			Flush: 0.60-30.60 polymer, 100 %	29/03/2008 1.30	0800 3.90
15.50-17.00	100 73 43				
16.54-16.68		60 140 300	CS 11		
17.00-18.50	100 100				
17.87-18.00	67		CS 12		
18.93-19.22			CS 13		
18.50-19.90	100 100 54				

Strata

Description (Continued from Sheet 1)

Very weak thinly laminated light grey MUDSTONE. Fractures are subhorizontal, very closely spaced, planar, smooth. — firm clay

10.60-10.70 m NI

11.00-11.05 m firm clay

Weak to medium strong thinly laminated dark grey SILTSTONE. Fractures are very closely to medium spaced, undulating, rough.

11.50-11.66 m 1 No. 80 deg undulating rough fracture

11.67-11.75 m very weak mudstone

11.90-11.96 m 1 No. 45 deg undulating rough fracture

11.96-12.00 m NI

12.10-12.30 m 3 No. 80 deg undulating rough fracture

Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, smooth.

12.50-12.60 m 1 No. 90 deg planar rough fracture

12.96-13.05 m NI

Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

14.00-14.20 m Extremely closely spaced fractures

15.70-15.90 m strong light grey fine to medium grained sandstone

16.23-16.28 m very weak siltstone

16.90-17.00 m 1 No. 90 deg planar rough fracture

Medium strong to strong, locally weak, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, undulating, smooth.

17.00-17.20 m stiff clay

17.43-17.55 m frequent thin laminae of black siltstone

19.22-19.27 m 1 No. 90 deg planar smooth fracture

19.59-19.78 m 1 No. 45 deg undulating rough fracture

Stratum continues to 29.85 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
(1.30)		
11.10 *+80.79*		
(1.70)		
12.80 *+79.09*		
(0.70)		
13.50 *+78.39*		
(3.50)		
17.00 *+74.89*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole **BH203**

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** BS **Checked** JT	**Start** 10/03/2008 **End** 31/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.60m / 150mm / 1.30m 0.60m / 30.60m / 121mm / 1.30m			**Ground Level** +91.89 mOD **Coordinates** E 434655.60 **National Grid** N 406261.00 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
	100				
19.90-21.40	100				
	99				
20.92-21.07			CS 14		
21.07-21.40			CS 15		
	100				
21.40-22.90	98				
	93				
				29/03/2008	
				1.30	2.90
				31/03/2008	0800
				1.30	6.60
	100				
22.90-24.40	93				
23.72-23.90	93		CS 16		
		90			
		300			
		610			
	100				
24.40-25.90	87				
	87				
	100				
25.90-27.40	83				
	83				
	100				
27.40-29.30	97				
	97				
	92				
	59				
29.30-30.60	40				

Strata

Description (Continued from Sheet 2)

Medium strong to strong, locally weak, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, undulating, smooth.

23.20-23.34 m 1 No. 45 deg undulating rough fracture

23.60-23.70 m 1 No. 90 deg planar rough fracture

25.15-25.40 m 1 No. 80-90 deg planar smooth fracture

25.80-25.90 m NI

25.90-26.10 m 1 No. 90 deg planar smooth fracture

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
(12.85)		
29.85 *+62.04*		

Stratum continues to 30.20 m

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole **BH203**

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** BS **Checked** JT	**Start** 10/03/2008 **End** 31/03/2008	**Equipment, Methods and Remarks** Dando cut down rig. Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.60m / 150mm / 1.30m 0.60m / 30.60m / 121mm / 1.30m	**Ground Level** +91.89 mOD **Coordinates** E 434655.60 **National Grid** N 406261.00 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		NI			
		50		31/03/2008	
		50		1.30	8.70

Strata

Description (Continued from Sheet 3)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Very weak black vitreous COAL. Fractures are subhorizontal, closely spaced, planar, rough.	(0.35) 30.20 *+61.69*		
30.29-30.33 m 1 No. 90 deg undulating rough fracture			
Strong to very strong dark grey SILTSTONE. Fractures are subhorizontal, very closely spaced, planar, rough.	(0.40) 30.60 *+61.29*		
EXPLORATORY HOLE ENDS AT 30.60 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH203

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.80m / 150mm / 4.40m 4.80m / 9.95m / 146mm / 9.95m 9.95m / 20.15m / 121mm / 13.05m	**Ground Level** +90.97 mOD **Coordinates** E 434657.80 **National Grid** N 406333.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-1.00	B 1			
1.00-1.45	SPT S	N=9 (2,2/2,2,2,3)	1.00	dry
1.00	ES 1A			
1.00-1.45	D 2			
1.00-1.50	B 3			
2.00-2.45	SPT S	N=18 (3,3/4,4,5,5)	2.00	dry
2.00	ES 2A			
2.00-2.45	D 4			
2.00-3.00	B 5			
3.00-3.45	SPT S	N=14 (2,1/2,4,4,4)	2.00	dry
3.00	ES 3A			
3.00-3.45	D 6			
3.00-4.00	B 7			
4.00-4.45	SPT S	N=21 (2,4/4,5,6,6)	4.00	3.30
4.00	ES 4A			
4.00-4.45	D 8			
4.60-4.76	SPT S	50 (2,19/50 for 6mm)	07/03/2008	
4.60-4.81	D 9		4.40	dry
4.80-4.80	SPT C	50 (25 for 1mm/50 for 1mm)	27/03/2008	0800
			4.40	3.70
4.80-5.85	100 72 36	10 130 320		
		NI 180 180		
5.85-7.35	100 73 61	Flush: 4.80-8.85 polymer, 100 %		
		NI 90 200		
7.92-8.13		CS 10		
7.35-8.85	100 57 20			
			27/03/2008	
			4.50	
9.00-9.14		CS 11	28/03/2008	0800
			4.50	3.60
8.85-9.95	100 49 31	Flush: 8.85-9.95 polymer, 80 %		
		35 120 470		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE (MADE GROUND) (Foreman's description)	(0.35) 0.35 *+90.62*		
Hardcore. (MADE GROUND) (Foreman's description)	0.50 *+90.47*		
Firm to stiff brown mottled black slightly sandy gravelly CLAY. Gravel is angular to rounded fine to medium of various lithologies including sandstone and mudstone (MADE GROUND)	(4.00)		1
3.20 m very gravelly clay			1
Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, extremely closely to medium spaced, planar, smooth. Locally grading to a very stiff clay.	4.50 *+86.47*		
5.05-5.20 m NI black siltstone	(1.35)		
5.75-5.85 m very weak black mudstone	5.85 *+85.12*		
Very weak black vitreous COAL. Fractures are horizontal, closely spaced, planar, smooth.	(0.60)		
6.45-6.60 m dark grey and black mudstone	6.45 *+84.52*		
Very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely spaced, undulating, rough. Locally grading to a very stiff clay.	(1.45)		
7.20-7.35 m soft gravelly clay			
7.50-7.85 m NI			
Medium strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, rough.	7.90 *+83.07*		
7.90-7.95 m 1 No. 45 deg undulating rough fracture			
8.15-8.53 m 1 No. 90 deg undulating rough fracture			
8.75-9.00 m very weak siltstone			
8.80-9.00 m NI			
9.80-9.95 m NI	(3.80)		
Stratum continues to 11.70 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.50	Rose to 2.90 m after 20 minutes.	4.10

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 200mm.
4.80		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
4.80 -4.80	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH206

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.80m / 150mm / 4.40m 4.80m / 9.95m / 146mm / 9.95m 9.95m / 20.15m / 121mm / 13.05m	**Ground Level** +90.97 mOD **Coordinates** E 434657.80 **National Grid** N 406333.70 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.12-10.54			CS 12		
9.95-11.00	100 75 59				
11.47-11.63			CS 13		
11.00-13.05	68 26 13		Flush: 9.95-14.65 polymer, 90 %		
		NI 50 50			
13.05-14.65	81 63				
13.90-14.22	34		CS 14		
14.42-14.65			CS 15	28/03/2008 13.05	
				29/03/2008 13.05	0800 4.00
		20 110 340			
15.75-15.96			CS 16		
14.65-17.35	96 90		Flush: 14.65-17.35 polymer, 80 %		
16.12-16.29	50		CS 17		
16.80-17.00			CS 18		
17.55-17.65			CS 19		
		30 50 120			
17.35-20.15	93 80 41		Flush: 17.35-20.15 polymer, 0 %		
18.95-19.05			CS 20		
19.23-19.47		20 120 400	CS 21		
19.50-19.64			CS 22		
				29/03/2008	

Strata

Description (Continued from Sheet 1)

Medium strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, rough.

10.50-11.00 m NI locally grading to hard clay

11.00-11.07 m NI soft clay

11.37-11.43 m 1 No. 45 deg planar smooth fracture

11.70 +79.27

Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely spaced, undulating, smooth.

11.80-11.92 m 1 No. 90 deg undulating rough fracture

12.00-12.40 m NI firm to stiff gravelly clay

12.40-13.35 m AZCL

(2.20)

13.35-13.90 m moderately strong

13.40-13.44 m 1 No. 45 deg planar rough fracture

13.44-13.48 m 1 No. 45 deg planar rough fracture

13.63-13.72 m NI

13.82-13.90 m NI

13.90 +77.07

Medium strong to strong, locally weak, thinly laminated light grey fine grained SANDSTONE/SILTSTONE. Fractures are horizontal, very closely to medium spaced, undulating, rough.

14.65-14.75 m AZCL

16.10-17.55 m frequent thick laminae of dark grey siltstone

16.45-17.00 m dark grey fine grained sandstone/siltstone

16.60-16.70 m 1 No. 90 deg planar smooth fracture

17.35-17.55 m AZCL

(3.65)

17.55 +73.42

Medium strong, locally weak, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are horizontal, very closely to medium spaced, undulating, rough.

(2.60)

Stratum continues to 20.15 m

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Depth, *Level* (Thickness) | **Legend** | **Backfill/ Instruments**

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole BH206

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.80m / 150mm / 4.40m 4.80m / 9.95m / 146mm / 9.95m 9.95m / 20.15m / 121mm / 13.05m	**Ground Level** +90.97 mOD **Coordinates** E 434657.80 **National Grid** N 406333.70 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				13.05	

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Medium strong, locally weak, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are horizontal, very closely to medium spaced, undulating, rough.	20.15 *+70.82*		
EXPLORATORY HOLE ENDS AT 20.15 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH206

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 25/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig. Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 4.00m – 250mm – 3.00m 4.00m – 5.40m – 200mm – 5.40m 5.40m – 21.90m – 146mm – 5.40m 21.90m – 30.90m – 121mm – 5.40m	**Ground Level** +91.19 mOD **Coordinates** E 434719.70 **National Grid** N 406308.20 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-1.00	B 1			
1.00-1.45	SPT S	N=5 (1,1/1,2,1,1)	1.20	dry
1.00	ES 1A			
1.00-2.00	B 2			
2.00-2.45	SPT S	N=4 (1,0/1,1,1,1)	2.00	dry
2.00	ES 2A			
2.00-2.41	D 3			
2.00-3.00	B 4			
3.00-3.45	SPT S	N=2 (1,0/1,0,1,0)	3.00	dry
3.00	ES 3A			
3.00-3.45	D 5			
3.00-4.00	B 6			
3.70	ES 4A			
3.80	ES 5A			
4.00-4.45	SPT S	N=4 (1,1/1,1,1,1)	4.00	3.90
4.00-4.60	B 7			
4.60-5.00	B 8			
5.00-5.16	SPT C	50 (7,10/50 for 5mm)	4.00	4.80
5.10	D 9		06/03/2008	
			4.00	4.70
5.40	SPT C	(25 for 0mm/50 for 0mm)	17/03/2008	0800
			4.00	dry
5.40-6.00	67 47 47	NI 100 210		
6.00-7.50	90 87 63			
7.26-7.50		CS 10	17/03/2008	
			5.40	0.00
			18/03/2008	0800
			5.40	1.10
8.17-8.35		CS 11		
7.50-9.50	90 80 26			
9.10-9.25		CS 12		
9.50-9.70	10 60 210	TCR 100, SCR 50, RQD 0		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE (MADE GROUND) (Foreman's description)	(0.35) 0.35 *+90.84*		
Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including brick, limestone, coal and sandstone. (MADE GROUND) — 1.00-2.00 m clayey	(1.65)		
Soft, locally very soft, grey mottled brown slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of sandstone, mudstone and coal. Slight hydrocarbon odour. (MADE GROUND)	2.00 *+89.19* (1.40)		
Very soft to soft brown to black slightly sandy gravelly CLAY/TAR. Gravel is angular to subangular fine to coarse of various lithologies including mudstone, brick and sandstone. Slight hydrocarbon odour. (MADE GROUND)	3.40 *+87.79* (1.70)		1
Very stiff grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone. — 5.50-5.60 m AZCL; 5.60-5.70 m 2 No. 90 deg undulating rough fractures with slight tar infilling	5.10 *+86.09* (0.30) 5.40 *+85.79*		SP
Weak to very weak black vitreous COAL. Fractures are subhorizontal, medium spaced, planar, smooth.	(0.75)		
Weak to very weak thinly laminated dark grey and black carbonaceous MUDSTONE. Fractures are subhorizontal, closely spaced, undulating, smooth. — 5.60-6.15 m slight hydrocarbon odour; 6.00-6.15 m AZCL; 6.15-6.65 m locally grading to firm gravelly clay; 6.77-6.82 m NI	6.15 *+85.04* (0.85)		
Weak to very weak black vitreous COAL. Fractures are subhorizontal, very closely spaced, planar, rough. — 7.15-7.20 m NI; 7.20-7.30 m hard clay	7.00 *+84.19* 7.20 *+83.99*		
Very weak to weak thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, extremely closely to medium spaced, planar, rough. — 7.50-7.70 m AZCL; 7.50-9.50 m drilling induced fractures; 7.70-7.90 m locally grading to hard clay; 9.45-9.50 m dark grey and black; 9.70-9.80 m AZCL; 9.70-11.70 m drilling induced	(4.50)		
Stratum continues to 11.70 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.70	Rose to 3.60 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 200mm.
3.40	5.40	Bentonite plug.
5.40		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
0.30 -0.35	15 mins	
5.30 -5.40	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH207

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 25/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig. Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.00m / 250mm / 3.00m 4.00m / 5.40m / 200mm / 5.40m 5.40m / 21.90m / 146mm / 5.40m 21.90m / 30.90m / 121mm / 5.40m		**Ground Level** +91.19 mOD **Coordinates** E 434719.70 **National Grid** N 406308.20 **Chainage**		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.22-10.35			CS 13		
9.70-11.80	95 66 15				
				18/03/2008 5.40	0.00
				19/03/2008 5.40	0800 0.80
12.14-12.44 11.80-12.60	100 88 64		CS 14		
12.60-13.30 12.95-13.13	100 57 27		CS 15		
		30 100 300			
13.30-15.30	70 55 19				
		10 20 40			
15.30-17.40	95 76 29		Flush: 5.40-27.90 polymer, 100 %		
16.96-17.13			CS 16		
				19/03/2008 5.40	0.00
				20/03/2008 5.40	0800 2.60
17.90-18.03			CS 17		
18.73-19.05 17.40-20.30	93 83 72		CS 18		

Strata

Description (Continued from Sheet 1)

Very weak to weak thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, extremely closely to medium spaced, planar, rough. — fractures

11.70 +79.49

Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, smooth. — 11.70-11.80 m drilling induced fractures; 12.67-12.94 m NI; 13.10-13.15 m medium grained sandstone; 13.10-13.30 m locally grading to hard clay; 13.30-13.90 m AZCL; 13.30-15.30 m drilling induced fractures; 14.30-14.70 m Very weak mudstone locally grading to hard clay

(3.20)

14.90 +76.29

Weak thinly laminated black carbonaceous SILTSTONE. Fractures are subhorizontal, extremely closely to very closely spaced, planar, smooth. — 15.30-15.40 m AZCL; 15.40-15.52 m NI

(0.77)

15.67 +75.52

Very weak black vitreous COAL. Fractures are subhorizontal, extremely closely to very closely spaced, planar, smooth — 16.07-16.10 m soft grey clay

(0.53)

16.20 +74.99

Weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, rough. — 16.30-16.40 m locally grading to hard clay; 16.64-16.70 m locally grading to hard clay

(1.00)

17.20 +73.99

Medium strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough. — 17.40-17.60 m AZCL; 18.20-18.30 m 1 No. 45 deg undulating rough fracture; 18.50-18.65 m very weak mudstone; 19.12-19.20 m NI; 19.86-19.93 m NI

Stratum continues to 25.70 m

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Depth, *Level* (Thickness) | **Legend** | **Backfill/ Instruments**

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH207

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 25/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig. Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from**	**to**	**Diameter**	**Casing Depth**	**Ground Level**	+91.19 mOD
			0.00m	4.00m	250mm	3.00m	**Coordinates**	E 434719.70
			4.00m	5.40m	200mm	5.40m	**National Grid**	N 406308.20
			5.40m	21.90m	146mm	5.40m	**Chainage**	
			21.90m	30.90m	121mm	5.40m		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.12-20.30			CS 19		
20.30-20.58			CS 20		
20.30-21.90	100 81 66	60 160 260			
				20/03/2008 5.40	0.00
21.90-22.12			CS 21		
				25/03/2008 5.40	0800 8.90
23.10-23.50			CS 22		
21.90-24.90	100 81 75				
24.80-24.90			CS 23		
26.30-26.50 24.90-27.90	97 86 78		CS 24		
27.20-27.56			CS 25		
		70 160 1000			
27.90-30.90	100 98 93		Flush: 27.90-30.90 polymer, 50 %		

Strata

Description (Continued from Sheet 2)

Medium strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

very weak siltstone

20.90-20.95 m 1 No. 45 deg undulating rough fracture

21.17-21.30 m 1 No. 45 deg undulating rough fracture

21.37-21.90 m 1 No. 90 deg undulating rough fracture

22.78-22.90 m NI very gravelly clay

23.20-23.85 m locally grading to fine grained sandstone

24.00-24.10 m extremely closely spaced fractures

24.00-25.00 m frequent thick laminae of mudstone

24.75-24.80 m very weak siltstone

24.80-24.85 m 1 No. 45 deg undulating smooth fracture

24.90-25.00 m AZCL

Medium strong to strong light grey fine grained SANDSTONE.
Fractures are subhorizontal, closely to widely spaced, planar, rough.

26.60-26.80 m locally NI

26.60-27.20 m frequent thick laminae of mudstone/siltstone

28.66-28.69 m 5 No. thick laminae of coal

Stratum continues to 30.90 m

Depth, *Level* (Thickness)		Legend	Backfill/ Instruments
			SP
(8.50)			
25.70	*+65.49*		
(5.20)			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

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Borehole

BH207

Borehole Log

Soil Mechanics

Drilled CB/PG **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 25/03/2008	**Equipment, Methods and Remarks** Beretta T41, Dando cut down rig. Cable percussion boring. Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from**	**to**	**Diameter**	**Casing Depth**	**Ground Level**	+91.19 mOD
			0.00m	4.00m	250mm	3.00m	**Coordinates**	E 434719.70
			4.00m	5.40m	200mm	5.40m	**National Grid**	N 406308.20
			5.40m	21.90m	146mm	5.40m	**Chainage**	
			21.90m	30.90m	121mm	5.40m		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				25/03/2008 5.40	8.85

Strata

Description (Continued from Sheet 3)

Medium strong to strong light grey fine grained SANDSTONE.
Fractures are subhorizontal, closely to widely spaced, planar, rough.

30.01-30.71 m 2 No. 45 deg planar smooth fractures

30.60-30.80 m locally grading to fine to coarse grained sandstone

30.71-30.72 m 1 No. thick laminae of coal

EXPLORATORY HOLE ENDS AT 30.90 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
30.90 *+60.29*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH207

Borehole Log

Soil Mechanics

Drilled CB **Logged** BS/KW **Checked** JT	**Start** 10/03/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** 0.00m – 4.50m 4.50m – 36.90m	**Diameter** 150mm 121mm	**Casing Depth** 1.20m 9.00m

Ground Level +91.22 mOD
Coordinates E 434734.80
National Grid N 406352.10
Chainage

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-1.00 0.50	B 1 ES 1			
1.00-1.45 1.00-1.45 1.00-2.00	SPT S D 2 B 3	N=13 (3,3/3,3,3,4)	1.20	dry
2.00-2.45 2.00 2.00-2.45	SPT S ES 2 D 4	N=16 (3,4/4,4,4,4)	1.20	dry
2.80	D 5			
3.00-3.45 3.00 3.00-3.45	SPT S ES 3 D 6	N=18 (4,4/4,5,4,5)	1.20	dry
3.80	D 7			
4.00-4.45 4.00 4.00-4.45	SPT S ES 4 D 8	N=49 (9,10/10,11,11,17)	1.20 10/03/2008 1.20	dry dry
4.50-4.50	SPT C	(25 for 1mm/50 for 0mm)	01/04/2008 1.20	0800 dry
4.50-6.00	100 93 80	50 50 1000		
			01/04/2008 4.50	 1.40
		NI 50 60	02/04/2008 4.50	0800 2.30
6.00-8.80 7.43-7.80	89 69 48	10 50 90 CS 9		
8.85-9.03		CS 10		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND) (Foreman's description)	0.20 *+91.02* (0.30)		
0.50-1.00 m very gravelly Clay. (MADE GROUND) (Foreman's description)	0.50 *+90.72*		
Firm becoming stiff thinly laminated dark grey black slightly sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of brick, quartz and mudstone. (MADE GROUND)	(3.30)		
Very weak dark grey MUDSTONE locally grading to hard clay.	3.80 *+87.42* (0.70)		
Very weak thinly laminated dark grey MUDSTONE. Locally grading to firm clay. Fractures are subhorizontal, very closely to widely spaced, planar, smooth.	4.50 *+86.72* (1.38)		
5.88-5.92 m 1 No. 90 deg undulating rough fracture 6.00-6.30 m AZCL 6.35-6.40 m very soft light grey gravelly clay Very weak dark grey and black vitreous COAL. Fractures are subhorizontal, very closely spaced, planar, smooth.	5.88 *+85.34* (0.62)		
6.50-6.80 m firm clay 6.83-6.85 m 1 No. 2mm diameter horizontal vein of pyrite Very weak thinly laminated dark grey and black carbonaceous SILTSTONE. Fractures are subhorizontal, extremely closely to closely spaced, planar, rough.	6.50 *+84.72* (0.80)		
7.25-7.30 m gravelly clay Very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, rough.	7.30 *+83.92* (1.50)		
8.37-8.42 m 1 No. 90 deg undulating rough fracture 8.40-8.80 m hard clay 8.80-8.87 m NI Weak locally medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely spaced, planar, rough.	8.80 *+82.42*		
9.42-9.50 m 1 No. 45 deg planar smooth fracture 9.65-9.75 m 1 No. 45 deg planar smooth fracture			
Stratum continues to 12.35 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.20	Concrete core 200mm.
4.50		Cable percussion refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used
4.45 -4.50	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
Carried out for 1249 Regeneration Partnership LLP

Borehole
BH210
Sheet 1 of 4

Borehole Log

Soil Mechanics

Drilled CB **Logged** BS/KW **Checked** JT	**Start** 10/03/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.50m / 150mm / 1.20m 4.50m / 36.90m / 121mm / 9.00m	**Ground Level** +91.22 mOD **Coordinates** E 434734.80 **National Grid** N 406352.10 **Chainage**		

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.10-10.20			CS 11		
8.80-11.80	100 87 31	70 140 190			
11.40-11.56			CS 12		
12.10-12.31			CS 13		
13.20-13.35	57	50 80 150	CS 14		
11.80-14.80	54 23				
				02/04/2008 4.50	3.75
				03/04/2008 4.50	0800 4.20
15.12-15.22			CS 15		
14.80-17.80	97 43 26	10 NI 60 NI 60 200			
17.60-17.80			CS 16		
17.80-18.10			CS 17		
18.80-18.97		80 170 280	CS 18		
17.80-20.80	100 87 64				
19.80-20.00			CS 19		

Strata

Description (Continued from Sheet 1)

Weak locally medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely spaced, planar, rough.
10.31-10.60 m locally grading to fine grained sandstone
10.50-10.59 m 1 No. 80 deg undulating rough fracture
10.80-11.16 m 1 No. 70-80 deg planar smooth fracture
11.22-11.30 m 1 No. 45 deg planar smooth fracture

Weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, smooth.
12.54-12.58 m 1 No. 45 deg planar rough fracture
12.70-12.80 m NI
12.80-12.94 m 1 No. 70-80 deg undulating smooth fracture
12.94-13.20 m locally fractures are extremely closely spaced
14.00-14.50 m very weak mudstone locally grading to stiff clay. NI
14.50-14.80 m AZCL
14.90-15.00 m 1 No. 90 deg undulating rough fracture
15.20-15.30 m soft clay

Weak thinly laminated dark grey and black carbonaceous SILTSTONE. Fractures are extremely closely to closely spaced, planar, smooth.

16.07-16.17 m AZCL
Very weak black vitreous COAL.

Very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to spaced, undulating, smooth.

Weak to medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.
17.30-17.50 m 1 No. 90 deg undulating rough fracture

Weak to medium strong thinly laminate dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, smooth.
18.50-18.60 m locally grading to siltstone
19.10-19.20 m locally grading to siltstone
19.30-19.40 m fractures are very closely spaced

Medium strong to strong thinly laminated dark grey SILTSTONE. Fractures are

Stratum continues to 27.40 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
(3.55)		
12.35 *+78.87*		
(3.15)		
15.50 *+75.72*		
15.65 *+75.57*		
(0.52)		
16.17 *+75.05*		
(0.93)		
17.10 *+74.12*		
(0.90)		
18.00 *+73.22*		
(1.50)		
19.50 *+71.72*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
Carried out for 1249 Regeneration Partnership LLP

Borehole BH210

Borehole Log

Soil Mechanics

Drilled CB **Logged** BS/KW **Checked** JT	**Start** 10/03/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.50m / 150mm / 1.20m 4.50m / 36.90m / 121mm / 9.00m	**Ground Level** +91.22 mOD **Coordinates** E 434734.80 **National Grid** N 406352.10 **Chainage**			

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
			Flush: 4.50-36.90 polymer, 100 %		
21.20-21.60			CS 20		
20.80-23.80	100 82				
22.37-22.50	67		CS 21		
23.30-23.48		70 160 570	CS 22	03/04/2008 4.50	2.90
				04/04/2008 4.50	0800 3.90
24.38-24.50			CS 23		
24.90-25.23			CS 24		
23.80-26.80	100 98 68				
26.56-26.67			CS 25		
27.56-27.75			CS 26		
26.80-29.10	100 90 76				
29.10-29.54			CS 27	04/04/2008 7.50	3.60
				05/04/2008 7.50	0800 4.80

Strata

Description (Continued from Sheet 2)

subhorizontal closely to medium spaced, planar, rough.

20.18-20.24 m 1 No. 45 deg undulating rough fracture
20.40-20.45 m 1 No. 45 deg undulating rough fracture
20.50-20.55 m 1 No. 45 deg undulating rough fracture
20.66-20.80 m 1 No. 90 deg planar smooth fracture
21.05-21.12 m 1 No. 45 deg planar rough fracture
21.95-22.40 m 1 No. 80-90 deg stepped striated fracture

Depth, *Level* (Thickness): (7.90)

24.10-24.36 m strong light grey fine grained sandstone

25.40-25.80 m very closely spaced fractures

26.30-26.50 m 1 No. 90 deg planar rough fracture

26.80-27.40 m frequent thin laminae of black siltstone
27.13-27.22 m 1 No. 80 deg planar rough fracture

27.40 *+63.82*

Medium strong to strong light grey fine grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, planar, rough.

Legend: SP

Backfill/ Instruments

Stratum continues to 35.55 m

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
Carried out for 1249 Regeneration Partnership LLP

Borehole BH210

Borehole Log

Soil Mechanics

Drilled CB **Logged** BS/KW **Checked** JT	**Start** 10/03/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Beretta T41 Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 4.50m / 150mm / 1.20m 4.50m / 36.90m / 121mm / 9.00m	**Ground Level** +91.22 mOD **Coordinates** E 434734.80 **National Grid** N 406352.10 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
	100				
29.10-32.10	100				
30.60-30.80	98		CS 28		
		130			
		420			
		1000			
32.10-32.20			CS 29		
	100				
32.10-34.20	97				
	79				
				05/04/2008	
				9.00	3.10
				07/04/2008	0800
				9.00	3.80
	94				
34.20-36.90	76				
	72				
		NI			
		190			
		190			
		300			
		325			
		350			
				07/04/2008	
				9.00	

Strata

Description
(Continued from Sheet 3)

Medium strong to strong light grey fine grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, planar, rough.

34.50-34.60 m dark grey brown sandstone. Frequent thin laminae of coal

35.00-35.10 m dark grey brown sandstone. Frequent thin laminae of coal

35.30-35.35 m dark grey brown sandstone. Frequent thin laminae of coal

Very weak black vitreous COAL. Fractures are subhorizontal, closely spaced, undulating, rough.

36.10-36.20 m weak dark grey mudstone

36.30-36.80 m frequent randomly orientated thin laminae of coal

36.70-36.90 m dark grey siltstone

Strong locally very strong thinly laminated grey SILTSTONE. Fractures are subhorizontal, medium spaced, planar, rough.

EXPLORATORY HOLE ENDS AT 36.90 m

Depth, *Level* (Thickness)		Legend	Backfill/ Instruments
(8.15)			
35.55	*+55.67*		
(0.55)			
36.10	*+55.12*		
(0.80)			
36.90	*+54.32*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH210

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW/BS **Checked** JT	**Start** 03/03/2008 **End** 26/03/2008	**Equipment, Methods and Remarks** Comachio, Pilcon Cable percussion boring. Rotary core drilling (SWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.45m / 150mm / 3.00m 7.45m / 35.25m / 146mm / 10.50m			**Ground Level** +94.62 mOD **Coordinates** E 434708.70 **National Grid** N 406388.90 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-1.20 0.50-0.60	B 1 ES 1A			
1.20-1.65 1.20-1.65 1.20-2.00	SPT S D 2 B 3	N=57 (4,4/6,9,15,27)	1.20	dry
2.00-2.01 2.00 2.00-3.00	SPT S ES 2A B 4	50 (25 for 6mm/50 for 1mm)	2.00	dry
3.00-3.45 3.00 3.00-3.50	SPT S ES 3A B 5	N=36 (6,10/9,9,9,9)	3.00	dry
4.00-4.45 4.00 4.00-4.45 4.00-4.50	SPT S ES 4A D 6 B 7	N=26 (6,7/6,6,6,8)	3.00	dry
4.80	D 8			
5.30-5.75 5.30-5.75 5.50-6.50	SPT S D 9 B 10	N=43 (4,8/9,11,11,12)	3.00	dry
7.00-7.45 7.00-7.45	SPT S D 11	N=51 (4,7/9,12,12,18)	3.00 03/03/2008 3.00	dry dry
7.50-8.25	0 0 0	NA	17/03/2008 7.50	0800
8.25-8.85	0 0 0	NA		
8.85-9.75	50 0 0	NI		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
CONCRETE/tarmacadam. (Foreman's description) (MADE GROUND)	0.10 *+94.52* (0.30) 0.40 *+94.22*
Hardcore. (Foreman's description) (MADE GROUND)	(0.80)
Brown clayey gravelly fine SAND. Gravel is subangular to subrounded of brick, limestone, sandstone and slag. (MADE GROUND)	1.20 *+93.42*
Stiff light brown to dark brown mottled pale orange and yellow sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of various lithologies including brick, sandstone, mudstone, siltstone, clinker and slag. Occasional coarse gravel size pockets of coarse sand. (MADE GROUND)	(0.80) 2.00 *+92.62*
Very dense black mottled brown and red very clayey very gravelly SAND with low cobble content. Gravel is subangular to subrounded fine to coarse of various lithologies including brick, sandstone, mudstone, clinker and tar. Hydrocarbon odour. (MADE GROUND)	(1.00) 3.00 *+91.62*
Stiff light brown mottled pale yellow sandy gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies including brick, sandstone, mudstone and coal. (MADE GROUND)	(1.10) 4.10 *+90.52*
Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of various lithologies including sandstone, mudstone, siltstone and coal.	
5.50 m mottled black	(3.35)
7.10-7.30 m loose angular coarse gravel of sandstone	
GRAVEL. (Foreman's description)	7.45 *+87.17* (0.80)
MUDSTONE. (Foreman's description)	8.25 *+86.37* (0.60)
8.85-9.30 m AZCL Medium strong dark orange and grey fine to medium grained SANDSTONE.	8.85 *+85.77* (0.90)
9.70-9.75 m hard clay 9.75-9.95 m AZCL	9.75 *+84.87*
Stratum continues to 15.60 m	

Legend

Backfill/ Instruments

SP

1

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	7.10	Rose to 7.00 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.

Chiselling

Depths (m)	Time	Tools used
1.65 -1.75	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH212

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW/BS **Checked** JT	**Start** 03/03/2008 **End** 26/03/2008	**Equipment, Methods and Remarks** Comachio, Pilcon Cable percussion boring. Rotary core drilling (SWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.45m / 150mm / 3.00m 7.45m / 35.25m / 146mm / 10.50m	**Ground Level** +94.62 mOD **Coordinates** E 434708.70 **National Grid** N 406388.90 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.75-10.35	67 67 67			17/03/2008 9.75	 0.00
				19/03/2008 9.75	0800 2.10
10.35-12.25	32 16 0				
12.25-12.45			TCR 100, SCR 0, RQD 0		
		10 50 220			
12.45-13.75	88 54 35		Flush: 7.45-18.60 polymer, 100 %		
13.60-13.75			CS 12		
13.75-15.60	38 5 5				
				19/03/2008 10.30	 0.00
				20/03/2008 10.30	0800 2.20
15.60-16.60	100 70 40				
16.45-16.60			CS 13		
		70 90 230			
16.60-18.60	20 11 0				
				20/03/2008 10.30	
				25/03/2008 10.30	0800 2.60
18.60-19.35 19.00-19.10	100 51 35		CS 14		
19.78-20.05			CS 15		

Strata

Description (Continued from Sheet 1)

Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are extremely closely to medium spaced, planar, smooth.

10.25-10.35 m firm clay
10.35-11.65 m AZCL
10.35-12.25 m drilling induced fractures
11.65-12.25 m locally grading to firm to stiff clay
12.45-12.60 m AZCL
12.60-12.81 m NI
12.90-13.10 m black carbonaceous siltstone
12.97-13.00 m NI
13.20-13.75 m locally grading to hard clay
13.75-14.90 m AZCL
13.75-15.60 m drilling induced fractures
14.90-15.10 m very weak black mudstone
14.90-15.60 m locally grading to firm clay

Depth, *Level* (Thickness): (5.85)

15.60 *+79.02*

Medium strong to strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, undulating, rough.

15.60-15.80 m locally NI
16.23-16.27 m
16.23-16.43 m 1 No. 80 deg undulating rough fracture
16.60-18.20 m AZCL
16.60-18.60 m drilling induced fractures
18.60-18.80 m NI

Stratum continues to 25.05 m

Legend

Backfill/ Instruments

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
Carried out for 1249 Regeneration Partnership LLP

Borehole BH212

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW/BS **Checked** JT	**Start** 03/03/2008 **End** 26/03/2008	**Equipment, Methods and Remarks** Comachio, Pilcon Cable percussion boring. Rotary core drilling (SWF size) using polymer flush.	**Depth from** 0.00m 7.45m	**to** 7.45m 35.25m	**Diameter** 150mm 146mm	**Casing Depth** 3.00m 10.50m	**Ground Level** +94.62 mOD **Coordinates** E 434708.70 **National Grid** N 406388.90 **Chainage**

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
19.35-20.65	100 97 58				
20.98-21.13			CS 16		
20.65-22.05	100 100 88				
21.84-22.05			Flush: 18.60-25.05 polymer, 90 % CS 17		
22.05-22.33		40 170 440	CS 18		
22.05-23.55	100 89 77				
23.00-23.30			CS 19		
23.55-25.05	100 87				
24.40-24.58	67		CS 20		
				25/03/2008 10.30	0.00
				26/03/2008 10.30	0800 2.40
25.76-26.08	100 83				
25.05-26.55	63		CS 21		
27.10-27.35			CS 22		
26.55-28.05	100 82 78		Flush: 25.05-29.55 polymer, 100 %		
28.30-28.56			CS 23		
28.05-29.55	90 90 80				
		150 200 600			

Strata

Description (Continued from Sheet 2)

Medium strong to strong, locally weak, thinly laminated light grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, undulating, rough.

22.42-22.58 m 1 No. 90 deg planar rough fracture

24.60-24.80 m 1 No. 90 deg undulating smooth facture

~~24.88-24.95 m NI~~

Medium strong to strong light grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

26.10-26.27 m frequent thin laminae of black siltstone

26.30-26.65 m 1 No. 90 deg planar rough fracture

26.55-26.63 m 1 No. 90 deg planar rough fracture

28.05-28.20 m AZCL

28.54-28.58 m orange surface discolouration

28.70-28.80 m dark grey sandstone

29.55-29.65 m AZCL

Stratum continues to 33.95 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
(9.45)		
25.05 *+69.57*		
(8.90)		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH212

Borehole Log

Soil Mechanics

Drilled CB/DS **Logged** KW/BS **Checked** JT	**Start** 03/03/2008 **End** 26/03/2008	**Equipment, Methods and Remarks** Comachio, Pilcon Cable percussion boring. Rotary core drilling (SWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.45m / 150mm / 3.00m 7.45m / 35.25m / 146mm / 10.50m	**Ground Level** +94.62 mOD **Coordinates** E 434708.70 **National Grid** N 406388.90 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
29.55-31.05	93 80 67				
30.64-31.05			CS 24		
31.05-32.45	86 76 74		Flush: 29.55-35.25 polymer, 0 %		
32.45-33.75	100 85 72				
		NI			
33.75-35.25	100 77 52	40 130 250		26/03/2008 10.30	

Strata

Description (Continued from Sheet 3)

Medium strong to strong light grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

30.10-30.30 m orange surface discolouration

30.52-30.62 m NI

31.54-31.86 m 1 No. 90 deg undulating rough fracture. Orange and brown discolouration penetrating up to 2mm

32.25-32.45 m AZCL

32.76-33.44 m 1 No. 90 deg undulating rough fracture. Orange and brown discolouration penetrating up to 1mm

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
33.95 *+60.67*		
(0.33)		
34.28 *+60.34*		
(0.97)		
35.25 *+59.37*		

Weak black vitreous COAL.

Weak dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, smooth.

34.40-34.45 m NI

34.70-34.85 m siltstone

EXPLORATORY HOLE ENDS AT 35.25 m

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH212

Borehole Log

Soil Mechanics

Drilled CB/MB **Logged** BS **Checked** JT	**Start** 04/03/2008 **End** 01/04/2008	**Equipment, Methods and Remarks** Mobile, Pilcon Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.60m / 150mm / 4.70m 7.60m / 38.75m / 121mm / 7.60m	**Ground Level** +91.65 mOD **Coordinates** E 434792.90 **National Grid** N 406373.80 **Chainage**			

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-1.20	B 1			
0.60-0.70	ES 1A			
1.20-1.65	SPT S	N=25 (1,2/4,7,7,7)	1.20	dry
1.20-1.65	D 2			
1.20-1.70	B 3			
1.80	D 4			
2.00-2.45	SPT S	N=17 (3,3/3,4,5,5)	1.20	dry
2.00-2.45	D 5			
2.00-3.00	B 6			
3.00-3.45	U 7	56 blows	1.20	dry
3.45-3.65	D 8			
3.60-4.00	B 9			
4.00-4.45	SPT S	N=27 (5,6/6,7,7,7)	1.20	dry
4.00-4.45	D 10			
4.00-5.00	B 11			
5.00-5.15	U NR	75 blows No recovery	4.70	dry
5.50	D 12			
6.00-6.45	SPT S	N=39 (9,9/9,10,9,11)	4.70	dry
6.00-6.45	D 13			
6.00-7.00	B 14			
7.40-7.41	SPT S	50 (25 for 7mm/50 for 2mm)	04/03/2008	
7.40-7.49	D 15		4.70	6.00
7.60-7.60	SPT C	50 (25 for 1mm/50 for 1mm)	25/03/2008	0800
			7.60	4.20
7.60-8.85	100 82 48	Flush: 7.60-8.85 polymer, 100 %		
	60 90 150			
8.85-10.85	23 13 0			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam. (Foreman's description) (MADE GROUND)	0.10 *+91.55* (0.30)		
Hardcore. (Foreman's description) (MADE GROUND)	0.40 *+91.25*		
Medium dense dark grey and brown slightly silty sandy GRAVEL with cobble content. Gravel is angular fine to coarse of various lithologies including brick, sandstone and concrete. Cobbles are subangular of brick. (MADE GROUND)	(1.35) 1.75 *+89.90*		
Stiff to very stiff, very high strength, dark grey and brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone, quartz and sandstone.			
4.00-6.00 m locally mottled black	(5.65)		
7.20-7.40 m foreman notes fine gravel	7.40 *+84.25*		
Very stiff to hard thinly laminated dark grey slightly gravelly CLAY. Gravel is subangular fine of mudstone.			
7.60-8.85 m locally grading to stiff clay	7.60 *+84.05*		
Weak to very weak thinly laminated dark grey mottled orange SILTSTONE. Fractures are subhorizontal, closely spaced, undulating, rough.			
8.50-8.60 m 1 No. 90 deg undulating rough fracture 8.66-8.80 m 1 No. 90 deg undulating rough fracture 8.85-10.40 m AZCL	(2.80)		
Stratum continues to 10.40 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	7.20	Rose to 5.80 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.

Chiselling

Depths (m)	Time	Tools used
7.40 -7.60	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH219

Borehole Log

Soil Mechanics

Drilled CB/MB **Logged** BS **Checked** JT	**Start** 04/03/2008 **End** 01/04/2008	**Equipment, Methods and Remarks** Mobile, Pilcon Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m 7.60m	**to** 7.60m 38.75m	**Diameter** 150mm 121mm	**Casing Depth** 4.70m 7.60m	**Ground Level** +91.65 mOD **Coordinates** E 434792.90 **National Grid** N 406373.80 **Chainage**

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		20 40 60		25/03/2008 7.60	2.40
				26/03/2008 7.60	0800 4.20
10.85-11.85	100 60 31		Flush: 10.85-12.15 polymer, 100 %		
11.85-12.15			TCR 83, SCR 83, RQD 60		
		10 90 190			
12.15-14.20	39 10 0				
			If NI/50/50		
14.75-15.06			CS 16		
14.20-15.70	100 57 46		Flush: 14.20-16.20 polymer, 100 %		
15.30-15.50			CS 17		
		80 210 460			
15.70-16.20	26 26 26				
		40 90 180		26/03/2008 7.60	3.80
				27/03/2008 7.60	0800 4.20
16.20-18.20	80 75 15				
18.60-18.70	100		CS 18		
18.20-19.20	76 38				
19.50-19.60		70 140 260	CS 19		
19.20-20.70	80 57 29				

Strata

Description (Continued from Sheet 1)

Weak to very weak thinly laminated dark grey mottled orange SILTSTONE. Fractures are subhorizontal, closely spaced, undulating, rough.

10.40-10.85 m drilling induced fractures

Strong thinly laminated light grey SILTSTONE. Fractures are subhorizontal, very closely spaced, planar, smooth.

10.70-10.85 m NI

10.85-10.95 m NI

Weak locally very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, extremely closely to closely spaced, undulating, smooth.

11.35-11.43 m firm clay

11.70-11.75 m NI

11.85-11.90 m AZCL

12.08-12.15 m soft clay

12.15-13.40 m AZCL

13.40-14.20 m drilling induced fractures

14.20-14.40 m soft clay

Very weak dark grey and black vitreous COAL. Fractures are subhorizontal, very closely spaced, planar, smooth.

Weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, undulating, smooth.

15.50-15.60 m very soft clay

15.70-16.07 m AZCL

16.20-16.60 m AZCL

16.20-16.90 m drilling induced fractures

Medium strong to strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, smooth.

16.90-18.20 m drilling induced fractures

18.40-18.47 m NI

Medium strong, locally weak, thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, undulating, smooth.

19.20-19.50 m AZCL

19.82-20.02 m weak mudstone

Stratum continues to 22.40 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
10.40 *+81.25*		
(0.45)		
10.85 *+80.80*		
(3.60)		
14.45 *+77.20*		
14.70 *+76.95*		
(2.20)		
16.90 *+74.75*		
(1.70)		
18.60 *+73.05*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH219

Borehole Log

Soil Mechanics

Drilled CB/MB **Logged** BS **Checked** JT	**Start** 04/03/2008 **End** 01/04/2008	**Equipment, Methods and Remarks** Mobile, Pilcon Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.60m / 150mm / 4.70m 7.60m / 38.75m / 121mm / 7.60m	**Ground Level** +91.65 mOD **Coordinates** E 434792.90 **National Grid** N 406373.80 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.70-22.25	100 48 0	NI 60 100			
21.76-21.86			CS 20		
22.25-23.75	47 8 0	NI 50 50		27/03/2008 7.60	4.20
				28/03/2008 7.60	0800 4.20
24.47-24.54 23.75-25.25	100 64 15		CS 21		
24.80-25.02			CS 22		
25.25-25.35		60 100 230	CS 23		
25.25-26.75	100 88 46			28/03/2008 7.60	4.20
				31/03/2008 7.60	0800 4.20
26.94-27.20			CS 24		
26.75-28.75 27.85-28.00	100 98 87		CS 25		
		60 170 430	Flush: 18.20-38.75 polymer, 100 %		
29.00-29.20			CS 26		
28.75-30.75	88 88 81				

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Medium strong, locally weak, thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, undulating, smooth.	(3.80)		
20.70-20.80 m NI 20.80-20.85 m 1 No. 90 deg undulating rough fracture 20.85-21.00 m weak mudstone 21.10-21.15 m 1 No. 90 deg planar rough fracture 21.33-21.56 m locally NI 21.74-21.82 m 1 No. 90 deg undulating rough fracture			
21.82-21.90 m black siltstone 21.96-22.00 m 1 No. 90 deg undulating rough fracture 22.08-22.25 m hard clay.NI 22.25-22.40 m weak mudstone 22.25-22.48 m NI 22.56-23.36 m AZCL	22.40 *+69.25* 22.56 *+69.09* (1.14) 23.70 *+67.95*		
Weak thinly laminated dark grey and black SILTSTONE. Fractures are subhorizontal, very closely spaced, planar, smooth. Very weak black vitreous COAL.			
Weak to medium strong thinly laminated light grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, smooth. 23.70-23.80 m dark grey 23.70-23.90 m soft to firm clay 24.48-24.55 m NI 24.65-24.76 m NI. Soft clay	(2.90)		
25.97-26.13 m NI. Locally very weak mudstone			
26.60-26.75 m NI	26.60 *+65.05*		
Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough. 27.15-27.30 m locally grading to fine grained sandstone	(4.15)		
28.75-29.00 m AZCL			
29.60-29.80 m strong light grey fine grained sandstone			
Stratum continues to 30.75 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole BH219

Borehole Log

Soil Mechanics

Drilled CB/MB **Logged** BS **Checked** JT	**Start** 04/03/2008 **End** 01/04/2008	**Equipment, Methods and Remarks** Mobile, Pilcon Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 7.60m / 150mm / 4.70m 7.60m / 38.75m / 121mm / 7.60m	**Ground Level** +91.65 mOD **Coordinates** E 434792.90 **National Grid** N 406373.80 **Chainage**

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
30.23-30.34			CS 27		
30.93-31.23			CS 28		
30.75-32.75	100 95 85				
32.63-32.74			CS 29		
		180 300 1000			
33.75-33.87			CS 30		
32.75-35.75	100 87 39				
				31/03/2008 7.60	4.20
		NI 40			
35.96-36.05		70	CS 31	01/04/2008 7.60	0800
35.75-38.75	10 10 7	N/A			
				01/04/2008 7.60	

Strata

Description (Continued from Sheet 3)

Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

Medium strong to strong light grey fine grained SANDSTONE. Fractures are horizontal, closely to widely spaced, planar, rough.

31.75-32.05 m frequent thin laminae of dark grey mudstone

34.37-34.55 m strong grey siltstone

34.57-34.62 m firm clay

35.10-35.65 m 1 No. 80 deg planar rough fracture

35.65-35.75 m NI

35.65-36.05 m fractures are very closely to closely spaced, possibly drilling induced

Probably light grey SANDSTONE.

35.75-36.05 m frequent thick laminae of black siltstone

36.05-38.75 m AZCL

EXPLORATORY HOLE ENDS AT 38.75 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
30.75 *+60.90*		
(5.30)		
36.05 *+55.60*		
(2.70)		
38.75 *+52.90*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH219

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS/KW **Checked** JT	**Start** 03/04/2008 **End** 05/04/2008	**Equipment, Methods and Remarks** Commachio Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 15.20m **Diameter** 121mm **Casing Depth** 5.00m	**Ground Level** +94.51 mOD **Coordinates** E 434762.10 **National Grid** N 406236.00 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.50	B 1			
1.50-2.50	B 2			
5.10-6.10	90 75 60 NI 40 150	Flush: 5.10-6.10 Polymer, 100 %	03/04/2008 4.90	2.10
6.10-7.60	100 67 51 80 130 190		04/04/2008 5.00	0800 2.60
7.10-7.28		CS 3		
7.60-8.90	58 31 15 NI 60 120			
9.31-9.56		CS 4		
8.90-10.40	90 59 33			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
CONCRETE. (Foreman's description)	(0.50) 0.50 *+94.01*
Brown and red gravelly SAND with low cobble content. Gravel is angular to subrounded fine to coarse of various lithologies including brick, concrete and sandstone. Cobbles are angular of brick. (MADE GROUND)	(2.00) 2.50 *+92.01*
Firm to stiff dark brown locally black slightly sandy slightly gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of various lithologies including brick, sandstone and mudstone. Cobbles are angular of clinker. (MADE GROUND) 3.60 m sandy 3.80 m gravelly	(1.60) 4.10 *+90.41*
Stiff black and grey CLAY.	(0.80) 4.90 *+89.61*
Very weak black vitreous COAL. Fractures are subhorizontal, very closely to closely spaced, planar, rough. 5.10-5.20 m AZCL	(1.05) 5.95 *+88.56*
Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely spaced, planar, rough. 5.95-6.10 m hard clay 7.30-7.40 m NI 7.45-7.60 m hard clay	(2.50) 8.45 *+86.06*
Possible black COAL. (Foreman's description) 8.45-8.90 m AZCL	(0.45) 8.90 *+85.61*
Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, rough. 8.90-9.05 m AZCL 9.05-9.23 m hard clay 9.26-9.42 m strong light grey siltstone 9.69-9.74 m NI	
Stratum continues to 12.20 m	

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
2.50	5.00	Windowless sampling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH220

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS/KW **Checked** JT	**Start** 03/04/2008 **End** 05/04/2008	**Equipment, Methods and Remarks** Commachio Cable percussion boring. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 15.20m **Diameter** 121mm **Casing Depth** 5.00m	**Ground Level** +94.51 mOD **Coordinates** E 434762.10 **National Grid** N 406236.00 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		40			
		90			
		250			
	87				
10.40-11.90	51				
	17				
11.53-11.65			CS 5		
	100				
11.90-12.60	77				
	51			04/04/2008	
				5.00	
				05/04/2008	0800
				5.00	3.30
	88				
12.60-13.85	64				
	40				
13.43-13.59			CS 6		
		70			
		110			
		330			
	100				
14.52-14.85	76		CS 7		
13.85-15.20	65				
				05/04/2008	
				5.00	

Strata

Description
(Continued from Sheet 1)

Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, undulating, rough.

10.04-10.20 m firm gravelly clay
10.40-10.60 m AZCL
10.75-10.90 m NI. Locally grading to gravelly clay
10.90-11.01 m 1 No. 45 deg planar smooth fracture
11.20-11.30 m 1 No. 80 deg undulating rough fracture
11.76-11.90 m NI
11.83-11.90 m gravelly clay
11.90-12.10 m 1 No. 90 deg planar rough fracture
12.00-12.10 m 1 No. 45 deg non penetrative planar smooth fracture
12.10-12.20 m hard clay
12.60-12.75 m AZCL
12.75-12.80 m NI
13.65-13.72 m 1 No. 90 deg undulating rough fracture
13.85-14.10 m locally NI

Weak to medium strong thinly laminated light grey SILTSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.

EXPLORATORY HOLE ENDS AT 15.20 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
(3.30)		
12.20 *+82.31*		
(3.00)		
15.20 *+79.31*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
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Borehole
BH220
Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled CB/SB **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Pilcon/Hydreq Minor Cable percussion boring. Rotary open hole drilling.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.90m / 150mm / 1.20m 5.90m / 30.00m / 121mm / 5.00m	**Ground Level** +90.13 mOD **Coordinates** E 434819.00 **National Grid** N 406275.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50	B 1			
0.50	ES 1A			
1.20-1.35	SPT S	50 (7,18/50 for 1mm)	1.20	dry
1.20-1.30	D 2			
1.20-2.00	B 3			
2.00	ES 2A		1.20	
2.00-2.45	U 4	41 blows		dry
2.80	D 5			
3.00-3.30	SPT S	63 (7,11/18,45)	1.20	dry
3.00	ES 3A			
3.00-4.00	B 6			
4.00-4.45	SPT S	N=25 (4,6/6,6,7,6)	1.20	dry
4.00	ES 4A			
4.00-4.45	D 7			
4.00-4.90	B 8			
4.95	D 9		1.20	
5.00-5.78	U NR	100 blows No recovery		dry
5.20	D 10			
5.70-5.70	SPT S	(25 for 1mm/50 for 0mm)	05/03/2008	
5.90	SPT C	(25 for 0mm/50 for 0mm)	1.20	dry
			02/04/2008	0800
			5.00	1.60

Strata

Description	Depth, *Level* (Thickness)
Hardcore. (Foreman's description) (MADE GROUND)	(0.30) 0.30 *+89.83*
Brown slightly clayey gravelly SAND. Gravel is angular to subrounded fine to coarse of various lithologies including brick, mudstone and sandstone. Occasional coarse gravel size pockets of soft grey slightly gravelly clay. (MADE GROUND)	0.50 *+89.63*
Very stiff, high strength, brown locally yellow and brown mottled black slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including brick, concrete, mudstone, coal, clinker and weakly cemented sandstone. (MADE GROUND)	(3.50)
Stiff to very stiff grey to dark grey mottled black slightly sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of various lithologies including sandstone, mudstone and coal.	4.00 *+86.13* (0.90)
Very stiff thinly laminated dark grey sandy SILT.	4.90 *+85.23* 5.15 *+84.98*
Very dense yellow, orange and brown mottled grey and black very gravelly SAND with low cobble content. Gravel is angular to subangular of sandstone and coal.	(0.75)
Weathered SANDSTONE. (Foreman's description)	5.90 *+84.23* (1.60)
COAL. (Foreman's description)	7.50 *+82.63* (0.60)
Grey MUDSTONE. (Foreman's description)	8.10 *+82.03* (1.10)
Banded COAL. (Foreman's description)	9.20 *+80.93* (0.60)
	9.80 *+80.33*
Stratum continues to 17.60 m	

Legend: SP

Backfill/Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
5.90		Cable percussion refusal at hard stratum.
5.90	30.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used
5.80 -5.90	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH214

Borehole Log

Soil Mechanics

Drilled CB/SB **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Pilcon/Hydreq Minor Cable percussion boring. Rotary open hole drilling.	**Depth from / to / Diameter / Casing Depth** 0.00m / 5.90m / 150mm / 1.20m 5.90m / 30.00m / 121mm / 5.00m	**Ground Level** +90.13 mOD **Coordinates** E 434819.00 **National Grid** N 406275.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		Flush: 5.90-30.00 water, 100 %		

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MUDSTONE/SILTSTONE bands. (Foreman's description)	(7.80)		SP
COAL. (Foreman's description)	17.60 +*72.53* (0.60)		
MUDSTONE. (Foreman's description)	18.20 +*71.93* (2.50)		
Stratum continues to 20.70 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH214

Borehole Log

Soil Mechanics

Drilled CB/SB **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Pilcon/Hydreq Minor Cable percussion boring. Rotary open hole drilling.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.90m / 150mm / 1.20m 5.90m / 30.00m / 121mm / 5.00m	**Ground Level** +90.13 mOD **Coordinates** E 434819.00 **National Grid** N 406275.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			02/04/2008	
			5.00	0.00

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
MUDSTONE. (Foreman's description)			
	20.70 *+69.43*		
COAL. (Foreman's description)	(0.70)		
	21.40 *+68.73*		
MUDSTONE/SILTSTONE bands. (Foreman's description)	(2.30)		
	23.70 *+66.43*		
COAL. (Foreman's description)	(0.40)		
	24.10 *+66.03*		
MUDSTONE/SILTSTONE bands. (Foreman's description)	(4.40)		
	28.50 *+61.63*		
Hard SANDSTONE. (Foreman's description)	(1.50)		
EXPLORATORY HOLE ENDS AT 30.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH214

Borehole Log

Soil Mechanics

Drilled PG **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Beretta T41 Rotary core drilling (SWF/PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.80m / 146mm / 1.10m 9.80m / 34.10m / 121mm / 10.50m			**Ground Level** +91.89 mOD **Coordinates** E 434683.90 **National Grid** N 406238.20 **Chainage**	

Samples and Tests

Depth	Type & No		Records	Date Casing	Time Water
				05/03/2008	
				1.10	dry
				06/03/2008	0800
				1.10	dry
1.10-1.80	50 21 0				
1.80-2.40	100 57 0				
2.40-3.30	100 50 0	20 70 350			
3.30-4.00	86 79 71				
4.00-4.90	33 0 0				
		NI			
4.90-6.30	93 21 0				
				06/03/2008	
				1.10	0.00
		10 30 50		07/03/2008	0800
				1.10	1.30
6.90-7.16	93		CS 1		
6.30-7.80	93				
7.16-7.46	63		CS 2		
		30 120 370			
8.70-8.80 7.80-9.80	70 55 32		CS 3		
				07/03/2008	
				1.10	0.70
		20 120 370		10/03/2008	0800

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description		Depth, *Level* (Thickness)
CONCRETE (MADE GROUND) (Foreman's description)		(0.35) 0.35 *+91.54*
Weathered MUDSTONE (Foreman's description)		(0.75) 1.10 *+90.79*
Weak thinly laminated grey MUDSTONE. Fractures are subhorizontal very closely to medium spaced planar rough.	1.10-1.45 m AZCL 1.45-1.60 m NI 1.80-2.00 m NI 2.40-2.90 m NI	(3.20)
	2.94-3.00 m 1 No. 90 deg planar smooth fracture 3.30-3.40 m AZCL 3.50-4.00 m locally grading to hard clay 3.52-3.56 m 1 No. 80 deg planar smooth fracture	
Very weak black vitreous COAL. Recovered as angular fine to medium gravel.	4.30-4.90 m AZCL 4.90-5.00 m AZCL	4.30 *+87.59* (0.90) 5.20 *+86.69*
Very weak thinly laminated dark grey mottled black carbonaceous MUDSTONE. Locally grading to gravelly clay.	5.68-5.75 m black	(0.55) 5.75 *+86.14*
Very weak black locally vitreous COAL. Fractures are subhorizontal extremely closely to very closely spaced undulating rough	6.30-6.40 m AZCL	(0.65) 6.40 *+85.49*
Weak thinly laminated grey MUDSTONE. Fractures are subhorizontal very closely to medium spaced, undulating rough.	7.20-7.35 m grading to fine grained sandstone 7.80-8.40 m AZCL	(2.10) 8.50 *+83.39*
Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal very closely to medium spaced planar rough.	8.50-9.80 m drilling induced fractures 9.68-9.80 m fine grained sandstone 9.72-9.80 m 1 No.	(2.80)
Stratum continues to 11.30 m		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 200mm.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH202

Borehole Log

Soil Mechanics

Drilled PG **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Beretta T41 Rotary core drilling (SWF/PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.80m / 146mm / 1.10m 9.80m / 34.10m / 121mm / 10.50m			**Ground Level** +91.89 mOD **Coordinates** E 434683.90 **National Grid** N 406238.20 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00-10.35			CS 4	9.00	1.70
9.80-10.80	100 93 59				
10.70-10.80			CS 5		
10.80-11.30	50 20 20			10/03/2008 9.00	0.00
				11/03/2008 9.00	0800 1.90
			Flush: 1.10-22.20 polymer, 100 %		
11.30-13.30	100 93 0	25 75 130			
13.30-14.00	100 57 0				
14.00-15.50	100 53 21	NI			
15.50-15.73			CS 6		
		60 155 250		11/03/2008 9.00	0.70
				12/03/2008 9.00	0800 4.35
15.50-17.00	100 79 52				
16.66-16.90			CS 7		
17.00-17.16			CS 8		
17.00-18.50	100 77 47				
18.50-20.00	100 87 47	50 120 280			
19.66-19.80			CS 9		

Strata

Description (Continued from Sheet 1)

Medium strong, locally weak, thinly laminated dark grey SILTSTONE. Fractures are subhorizontal very closely to medium spaced planar rough.
- 90 deg undulating rough fracture
- 10.58-10.64 m 1 No. 80-90 deg planar rough fracture
- 10.80-11.05 m AZCL

Weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal very closely to closely spaced planar smooth.
- 11.30-13.30 m drilling induced fractures
- 13.30-13.55 m locally NI
- 13.40-13.54 m 1 No. 90 deg planar smooth fracture
- 13.40-13.80 m black carbonaceous mudstone
- 13.58-13.80 m 1 No. 90 deg undulating rough fractures

Very weak black vitreous COAL. Recovered as angular fine to medium gravel.
- 13.80-14.00 m locally grading to hard clay
- 14.06-14.16 m 2 No. 90 deg undulating rough fractures

Very weak thinly laminated MUDSTONE. Fractures are subhorizontal closely to medium spaced undulating smooth.
- 14.23-14.30 m firm to stiff clay
- 14.40-14.65 m black carbonaceous mudstone
- 15.20-15.80 m locally black
- 15.27-15.36 m firm to stiff clay
- 15.90-16.00 m NI
- 16.37-16.50 m 1 No. 80-90 deg undulating rough fracture

Weak thinly laminated light grey SILTSTONE. Fractures are subhorizontal very closely to medium spaced undulating rough
- 17.43-17.56 m NI
- 17.95-18.50 m 1 No. 90 deg planar rough to smooth fracture
- 18.85-18.90 m 1 No. 90 deg undulating rough fracture
- 19.15-19.33 m 1 No. 45 deg undulating rough fracture
- 19.55-19.60 m very weak

Stratum continues to 20.70 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
11.30 *+80.59*		
(3.35)		
14.65 *+77.24*		
(0.55)		
15.20 *+76.69*		
(1.50)		
16.70 *+75.19*		
(4.00)		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH202

Borehole Log

Soil Mechanics

Drilled PG **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Beretta T41 Rotary core drilling (SWF/PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.80m / 146mm / 1.10m 9.80m / 34.10m / 121mm / 10.50m	**Ground Level** +91.89 mOD **Coordinates** E 434683.90 **National Grid** N 406238.20 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.27-20.45	100		CS 10		
20.00-20.90	83 50				
				12/03/2008 10.50	2.10
				13/03/2008 10.50	0800 6.70
21.32-21.48	100		CS 11		
20.90-22.20	67 34				
22.57-22.82			CS 12		
22.20-23.70	100 80 63				
24.00-24.13			CS 13		
23.70-25.20	100 93 84	50 150 300			
			Flush: 22.20-28.20 polymer, 50 %		
25.85-26.03	87		CS 14		
25.20-26.70	71 35				
26.70-26.97			CS 15		
26.70-28.20	100 100 95				
				13/03/2008 10.50	2.10
				14/03/2008 10.50	0800 6.20
28.20-29.70	100 98				
29.10-29.30	84		CS 16		

Strata

Description (Continued from Sheet 2)

Weak thinly laminated light grey SILTSTONE. Fractures are subhorizontal very closely to medium spaced undulating rough

20.15-20.25 m NI

20.56-20.62 m brown fine grained sandstone

Depth, *Level* (Thickness): 20.70 *+71.19*

Weak thinly laminated grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced planar smooth.

21.05-21.15 m 1 No. 45 deg planar rough

21.15-21.25 m 1 No. 70-80 deg planar smooth fracture

(1.80)

22.10-22.20 m NI

22.20-22.40 m NI

22.50 *+69.39*

Strong, locally medium strong, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are subhorizontal very closely to widely spaced undulating rough.

23.20-26.70 m frequent thick laminae of dark grey siltstone

25.20-25.50 m AZCL

28.20-28.40 m very weak dark grey black carbonaceous sandstone

(11.60)

29.70-29.80 m 1 No. 90 deg non penetrative

Stratum continues to 34.10 m

Legend: SP

Backfill/ Instruments

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole BH202

Borehole Log

Soil Mechanics

Drilled PG **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Beretta T41 Rotary core drilling (SWF/PWF size) using polymer flush.	**Depth from / to / Diameter / Casing Depth** 0.00m / 9.80m / 146mm / 1.10m 9.80m / 34.10m / 121mm / 10.50m	**Ground Level** +91.89 mOD **Coordinates** E 434683.90 **National Grid** N 406238.20 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
29.70-31.10	100 88 63	50 250 740			
			Flush: 28.20-34.10 polymer, 100 %		
31.10-32.60	100 100 100				
32.60-34.10	100 100 99				
				14/03/2008 10.50	4.90

Strata

Description (Continued from Sheet 3)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Strong, locally medium strong, thinly laminated light grey fine to medium grained SANDSTONE. Fractures are subhorizontal very closely to widely spaced undulating rough. :: 29.70m - undulating rough fracture			
EXPLORATORY HOLE ENDS AT 34.10 m	34.10 +57.79		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH202

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 03/03/2008 **End** 10/03/2008	**Equipment, Methods and Remarks** Comaccio Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 9.50m / 146mm / 3.50m 9.50m / 24.15m / 121mm / 9.50m	**Ground Level** +92.00 mOD **Coordinates** E 434608.30 **National Grid** N 406319.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.60-2.65	19 0 0 NI		03/03/2008 1.60	
2.65-3.55	33 0 0	Flush: 0.00-5.75 polymer, 100 %	04/03/2008 1.60	0800 3.00
3.55-3.85		TCR 100, SCR 0, RQD 0	04/03/2008 3.50	0.00
3.85-5.75	53 12 0 NI 30 40		05/03/2008 3.50	0800 3.00
5.75-7.15 6.50-6.60	71 59 24 40 90 160	Flush: 5.75-7.15 polymer, 50 % CS 1		
7.15-9.10 8.64-8.73	87 75 0 20 50 90	Flush: 7.15-9.50 polymer, 0 % CS 2	05/03/2008 3.50	0.00
9.10-9.50	0 0 0		06/08/2008 3.50	0800 3.00
9.90-10.32		CS 9		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description		Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE (MADE GROUND) (Foreman's description)	0.40-3.85 m NI	(0.40) 0.40 *+91.60*		
MUDSTONE (Foreman's description)		(1.20)		
Medium strong dark grey brown fine to medium grained SANDSTONE. Recovered as subangular fine to coarse gravel.	1.60-2.45 m AZCL 2.65-3.25 m AZCL 3.50-3.55 m stiff clay 3.70-3.85 m stiff clay	1.60 *+90.40* (2.25)		
Weak to medium strong thinly laminated dark orange brown SILTSTONE. Fractures are subhorizontal very closely spaced planar rough, drilling induced.	3.85-4.75 m AZCL 5.50-5.75 m light grey	3.85 *+88.15* (1.90)		
Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal very closely to closely spaced planar smooth.	5.75-6.15 m AZCL 6.32-6.38 m 1 No. 90 deg undulating rough fracture 6.70-6.85 m locally grading to mudstone	5.75 *+86.25* (1.40)		
Medium strong, locally strong, thinly laminated light grey SILTSTONE. Fractures are subhorizontal extremely closely to closely spaced planar smooth drilling induced.	7.15-7.35 m AZCL 9.50-9.65 m AZCL 9.50-11.40 m fractures are horizontal very closely to medium	7.15 *+84.85* (4.25)		
Stratum continues to 11.40 m				

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.40	Concrete core 200mm.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH205

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 03/03/2008 **End** 10/03/2008	**Equipment, Methods and Remarks** Comaccio Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from to Diameter Casing Depth** 0.00m 9.50m 146mm 3.50m 9.50m 24.15m 121mm 9.50m	**Ground Level** +92.00 mOD **Coordinates** E 434608.30 **National Grid** N 406319.70 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.50-11.40	92 73 43	20 130 450	Flush: 9.50-11.40 polymer, 60 %		
				06/03/2008 9.50	0.00
				07/03/2008 9.50	0800
11.40-12.90	100 73	20 60			
12.17-12.24	15	120	CS 3		
13.13-13.28			CS 4		
13.35-13.70			CS 5		
12.90-14.25	96 85 48		Flush: 11.40-15.75 polymer, 50 %		
		20 140 380			
14.25-15.75	100 80 48				
15.75-16.06			CS 6		
16.06-16.13			CS 7		
15.75-17.50	100 100 91				
			Flush: 15.75-19.00 polymer, 0 %		
17.50-19.00	100 100 100				
		60 400 1000		07/03/2008 9.50	3.20
				10/03/2008 9.50	0800
19.00-20.15	100 100 96				

Strata

Description (Continued from Sheet 1)

Medium strong, locally strong, thinly laminated light grey SILTSTONE. Fractures are subhorizontal extremely closely to closely spaced planar smooth drilling induced.

:: 9.50m - spaced planar rough

11.15-11.26 m dark grey

Weak to medium strong thinly laminated dark grey fine grained SANDSTONE/SILTSTONE. Fractures are subhorizontal very closely to closely spaced undulating smooth.

11.50-11.80 m 1 No. 90 deg undulating rough fracture

11.70-11.80 m weak

Medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal very closely to medium spaced planar rough.

12.76-12.90 m 1 No. 90 deg undulating rough fracture

12.90-12.95 m AZCL

13.45-13.72 m light grey fine grained sandstone

13.90-14.10 m locally grading to fine grained sandstone

14.30-14.40 m weak

14.62-14.66 m 1 No. 90 deg undulating rough fracture

14.77-14.82 m firm clay

14.82-14.87 m 1 No. 90 deg planar rough fracture

15.50-15.75 m fine to coarse grained sandstone

Medium strong, locally weak, dark grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, planar, rough.

17.40-17.50 m dark grey

17.50-17.85 m AZCL

Stratum continues to 21.86 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
11.40 *+80.60*		
(1.30)		
12.70 *+79.30*		
(3.05)		
15.75 *+76.25*		
(6.11)		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole BH205

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 03/03/2008 **End** 10/03/2008	**Equipment, Methods and Remarks** Comaccio Rotary core drilling (SWF and PWF size) using polymer flush.	**Depth from to Diameter Casing Depth** 0.00m 9.50m 146mm 3.50m 9.50m 24.15m 121mm 9.50m	**Ground Level** +92.00 mOD **Coordinates** E 434608.30 **National Grid** N 406319.70 **Chainage**

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.15-20.33			CS 8		
20.15-21.65	100 100 93		Flush: 19.00-24.15 polymer, 30 %		
21.65-22.85	92 65 56	NI			
		60 120 200			
22.85-24.15	100 100 65	15 60 140		10/03/2008 9.50	

Strata

Description (Continued from Sheet 2)		Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Medium strong, locally weak, dark grey fine to medium grained SANDSTONE. Fractures are subhorizontal, closely to widely spaced, planar, rough.				
Weak to very weak black vitreous COAL	21.86-21.96 m AZCL	21.86 *+70.14* (0.40)		
Medium strong to strong dark grey fine to medium grained SANDSTONE. Fractures are subhorizontal extremely closely to closely spaced undulating smooth.	22.26-22.36 m muddy sandstone 22.44-22.47 m weak carbonaceous mudstone	22.26 *+69.74* (1.89)		
	23.50-23.73 m dark grey siltstone 23.72-23.83 m weak carbonaceous mudstone			
EXPLORATORY HOLE ENDS AT 24.15 m	24.05-24.15 m 1 No. 90 deg undulating rough fracture	24.15 *+67.85*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH205

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 31/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Comachio Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 22.40m **Diameter** 121mm **Casing Depth** 4.30m	**Ground Level** +91.36 mOD **Coordinates** E 434656.20 **National Grid** N 406362.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.70-2.20	100 100 0	Flush: 0.70-2.20 polymer, 100 %		
2.20-4.30	0 0 0	NA		
4.30-4.85	55 55 0	50 50 60	31/03/2008 4.30	0.00
			01/04/2008 4.30	0800 2.30
4.85-6.45	91 81 31	10 20 40 Flush: 4.30-6.45 polymer, 100 %		
6.45-7.95	87 43 30	NI 50 170		
7.74-7.95		CS 1		
8.63-8.79 7.95-9.45	93 63 45	30 90 210 CS 2		
9.20-9.30		CS 3		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
CONCRETE. (MADE GROUND)	(2.20)
MUDSTONE. (Foreman's description)	2.20 *+89.16* (2.10)
Very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely spaced, planar, rough. 4.30-4.55 m AZCL 4.30-4.85 m locally grading to firm clay 4.85-5.00 m AZCL	4.30 *+87.06* (0.78)
Very weak thinly laminated black SILTSTONE. 5.16-5.66 m 1 No. 90 deg undulating rough fracture	5.08 *+86.28*
Very weak black vitreous COAL. Fractures are subhorizontal, extremely closely to very closely spaced, undulating, rough.	5.16 *+86.20* (0.57)
Very weak to weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, smooth. 6.10-6.45 m locally grading to firm gravelly clay 6.45-6.65 m AZCL 6.65-6.83 m NI 7.20-7.25 m NI 7.41-7.52 m 1 No. 90 deg undulating rough fracture 7.52-7.79 m locally NI	5.73 *+85.63* (2.07)
Very weak to weak thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, rough. 7.95-8.05 m AZCL 8.20-8.34 m 1 No. 90 deg undulating rough fracture 8.84-8.90 m extremely closely spaced fractures	7.80 *+83.56* (1.50)
Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, 9.45-10.25 m AZCL 9.45-11.15 m locally NI	9.30 *+82.06*
Stratum continues to 13.10 m	

Legend: SP

Backfill/ Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.70	Concrete core 200mm.
2.20	4.30	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH211

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 31/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Comachio Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m	**to** 22.40m	**Diameter** 121mm	**Casing Depth** 4.30m

Ground Level +91.36 mOD
Coordinates E 434656.20
National Grid N 406362.50
Chainage

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.45-10.55	27 0 0				
		NI 50 50			
10.55-12.05	60 12 0				
				01/04/2008 4.30	0.00
				02/04/2008 4.30	0800 3.10
12.28-12.40			CS 4		
		40 110 180			
12.05-13.40	100 74 63				
13.00-13.40			CS 5		
13.92-14.02		25 130 260	CS 6		
13.40-14.90	100 73 26		Flush: 6.45-22.40 polymer, 90 %		
14.90-16.40	73 60 43				
15.82-15.92			CS 7		
		30 100 170			
16.40-17.50	68 52 45				
17.63-17.78	100		CS 8		
17.50-17.90	8 0				
18.33-18.56			CS 9		
18.72-18.82			CS 10		
17.90-20.60	100 90 76				

Strata

Description (Continued from Sheet 1)		Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
smooth.				
	10.55-11.15 m AZCL			
		(3.80)		
	11.62-11.72 m NI			
	11.81-12.15 m NI. Soft gravelly clay			
	12.68-12.74 m 1 No. 45 deg planar rough fracture			
		13.10 *+78.26*		
Medium strong to strong thinly laminated light grey SILTSTONE. Fractures are horizontal, very closely to medium spaced, planar, smooth.	13.10-13.40 m strong light grey fine grained sandstone 13.48-13.88 m 1 No. 90 deg undulating rough fracture	(1.80)		
	14.37-14.50 m 1 No. 80 deg non penetrative planar rough fracture 14.54-14.90 m strong light grey fine grained sandstone			
		14.90 *+76.46*		
Weak to medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, very closely to closely spaced, planar, smooth.	14.60-14.90 m 1 No. 90 deg undulating rough fracture 14.90-15.30 m AZCL			
	16.40-16.55 m AZCL	(2.80)		
		17.70 *+73.66*		
Weak to medium strong, locally strong, light grey fine grained SANDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.	18.10-18.40 m 1 No. 80-90 deg undulating rough fracture. Orange and brown discolouration			
	18.93-19.00 m NI			
Stratum continues to 22.40 m				

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
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Borehole
BH211

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS **Checked** JT	**Start** 31/03/2008 **End** 02/04/2008	**Equipment, Methods and Remarks** Comachio Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 22.40m **Diameter** 121mm **Casing Depth** 4.30m	**Ground Level** +91.36 mOD **Coordinates** E 434656.20 **National Grid** N 406362.50 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		80 160 530			
20.68-20.81			CS 11		
20.60-22.40	100 71 48			02/04/2008 4.30	4.00

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Weak to medium strong, locally strong, light grey fine grained SANDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough.	(4.70)		
21.14-21.23 m frequent thin laminae of black siltstone			
21.80-22.40 m 1 No. 90 deg undulating rough fracture			
22.35-22.40 m dark grey sandstone			
EXPLORATORY HOLE ENDS AT 22.40 m	22.40 *+68.96*		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH211

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS/DS **Checked** JT	**Start** 29/03/2008 **End** 30/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Rotary open hole drilling (PWF size) using water flush.	**Depth from** / **to** / **Diameter** 0.00m – 2.00m – 87mm 2.00m – 3.00m – 77mm 3.00m – 4.00m – 67mm 4.00m – 4.60m – 57mm 0.00m – 18.60m – 121mm	**Casing Depth** 4.50m	**Ground Level** +91.20 mOD **Coordinates** E 434742.40 **National Grid** N 406312.40 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00	L 1			
0.70-0.80	ES 1A			
1.00-2.00	L 2			
2.00-3.00	L 3			
2.70-2.80	ES 2A			
3.00-4.00	L 4			
4.00-4.60	L 5			
4.40-4.60	ES 3A		13/03/2008	dry
			29/03/2008	0800
			29/03/2008 4.50	
			30/03/2008 4.50	0800 3.70

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND) (Foreman's description)	(0.35) 0.35 *+90.85*		
Light grey and cream slightly silty slightly sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)	(2.15) 2.50 *+88.70*		
Firm to stiff dark grey locally mottled orange and brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium of mudstone. (MADE GROUND)	(0.50) 3.00 *+88.20*		
Firm locally soft slightly sandy gravelly CLAY. Gravel is angular fine to medium of various lithologies including brick, sandstone and concrete. (MADE GROUND)	(1.00) 4.00 *+87.20*		
Firm to stiff thinly laminated dark grey locally mottled black CLAY. 4.20-4.30 m strong hydrocarbon odour and silty sheen	(0.60) 4.60 *+86.60*		
MUDSTONE. (Foreman's description) 4.50 m driller notes oily sheen on flush returns	(3.40) 8.00 *+83.20*		SP
COAL. (Foreman's description)	(0.60) 8.60 *+82.60*		
MUDSTONE/SILTSTONE. (Foreman's description)			
Stratum continues to 18.60 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 150mm.
4.60		Windowless sample refusal at hard stratum.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH208

Borehole Log

Soil Mechanics

Drilled DS **Logged** BS/DS **Checked** JT	**Start** 29/03/2008 **End** 30/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Rotary open hole drilling (PWF size) using water flush.	**Depth from**	**to**	**Diameter**	**Casing Depth**	**Ground Level**	+91.20 mOD
			0.00m	2.00m	87mm	4.50m	**Coordinates**	E 434742.40
			2.00m	3.00m	77mm		**National Grid**	N 406312.40
			3.00m	4.00m	67mm		**Chainage**	
			4.00m	4.60m	57mm			
			0.00m	18.60m	121mm			

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			30/03/2008 4.50	3.20

Strata

Description
(Continued from Sheet 1)

MUDSTONE/SILTSTONE.
(Foreman's description)

(10.00)

18.60 *+72.60*

EXPLORATORY HOLE ENDS AT 18.60 m

Depth, *Level* (Thickness) | **Legend** | **Backfill/ Instruments**

SP

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

BH208

Borehole Log

Soil Mechanics

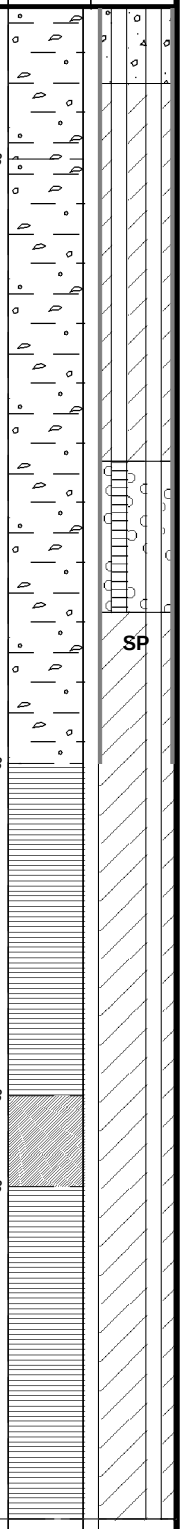
Drilled CS **Logged** CS **Checked** JT	**Start** 07/04/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Rotary open hole drilling (PWF size) using water flush.	**Depth from** to **Diameter** **Casing Depth** 0.00m 15.00m 121mm 5.00m	**Ground Level** +90.53 mOD **Coordinates** E 434810.30 **National Grid** N 406250.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
Grey gravelly CLAY (Foreman's description)	(1.00)
	1.00 *+89.53*
Brown gravelly CLAY with some boulders. (Foreman's description)	(4.00)
	5.00 *+85.53*
Grey MUDSTONE (Foreman's description)	(2.20)
	7.20 *+83.33*
COAL (Foreman's description)	(0.60)
	7.80 *+82.73*
Grey MUDSTONE (Foreman's description)	
Stratum continues to 15.00 m	



Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Borehole

BH213A

Borehole Log

Soil Mechanics

Drilled CS **Logged** CS **Checked** JT	**Start** 07/04/2008 **End** 07/04/2008	**Equipment, Methods and Remarks** Rotary open hole drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 15.00m **Diameter** 121mm **Casing Depth** 5.00m	**Ground Level** +90.53 mOD **Coordinates** E 434810.30 **National Grid** N 406250.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			07/04/2008 5.00	

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Grey MUDSTONE (Foreman's description)	(7.20)		
EXPLORATORY HOLE ENDS AT 15.00 m	15.00 *+75.53*		SP

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Borehole

BH213A

Borehole Log

Soil Mechanics

Drilled CB/SB **Logged** KW **Checked** JT	**Start** 30/03/2008 **End** 30/03/2008	**Equipment, Methods and Remarks** Hydreq Minor Rotary open hole drilling. Rotary core drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 15.00m **Diameter** 121mm **Casing Depth** 1.20m	**Ground Level** +90.44 mOD **Coordinates** E 434809.90 **National Grid** N 406260.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.20-1.21	SPT S	50 (25 for 1mm/50 for 4mm)	1.20	dry
2.00-2.00	SPT S	(25 for 1mm/50 for 0mm)		
		Flush: 0.00-9.10 water, 100 %		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Inspection Pit	(1.20)		
Weathered MUDSTONE. (Foreman's description)	1.20 *+89.24*		
Grey MUDSTONE. (Foreman's description)	(5.28) 6.48 *+83.96*		
COAL. (Foreman's description)	(2.42) 8.90 *+81.54* 9.10 *+81.34*		
Soft brown ground. (Foreman's description)			
Stratum continues to 15.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.

Chiselling

Depths (m)	Time	Tools used
1.90 -2.00	30 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Borehole

BH213

Borehole Log

Soil Mechanics

Drilled CB/SB **Logged** KW **Checked** JT	**Start** 30/03/2008 **End** 30/03/2008	**Equipment, Methods and Remarks** Hydreq Minor Rotary open hole drilling. Rotary core drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 15.00m **Diameter** 121mm **Casing Depth** 1.20m	**Ground Level** +90.44 mOD **Coordinates** E 434809.90 **National Grid** N 406260.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		Flush: 9.10-15.00 water, 0 %		
			30/03/2008 1.00	0.00

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Soft brown ground. (Foreman's description)	(5.90)		
EXPLORATORY HOLE ENDS AT 15.00 m	15.00 *+75.44*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH213

Borehole Log

Soil Mechanics

Drilled SB **Logged** BS **Checked** JT	**Start** 04/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Hydreq Minor Open hole drilling. Rotary core drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 30.00m **Diameter** 121mm **Casing Depth** 8.00m	**Ground Level** +90.97 mOD **Coordinates** E 434768.80 **National Grid** N 406336.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
Depth	**Type & No**	**Records**	**Date Casing**	**Time Water**

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Inspection pit	(0.60)		
Weathered SANDSTONE/MUDSTONE (Foreman's description)	0.60 *+90.37*		
	(10.05)		
Stratum continues to 10.65 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
1.20	16.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH215A

Borehole Log

Soil Mechanics

Drilled SB **Logged** BS **Checked** JT	**Start** 04/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Hydreq Minor Open hole drilling. Rotary core drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 30.00m **Diameter** 121mm **Casing Depth** 8.00m	**Ground Level** +90.97 mOD **Coordinates** E 434768.80 **National Grid** N 406336.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
16.00-18.00	85 39 26	Flush: 0.00-30.00 Water, 100 %		
18.00-20.00	35 8 0			

Strata

Description
(Continued from Sheet 1)

Weathered SANDSTONE/MUDSTONE
(Foreman's description)

10.65 +80.32

COAL
(Foreman's description)

(0.50)

11.15 +79.82

MUDSTONE/SILTSTONE bands.
(Foreman's description)

(4.85)

16.00 +74.97

Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely spaced, planar, smooth.

16.00-16.30 m AZCL

16.30-16.55 m very soft clay

16.65-16.90 m strong siltstone

17.00-17.33 m NI

18.00-19.30 m AZCL

(4.70)

19.30-19.60 m very soft clay

19.90-20.00 m NI

Stratum continues to 20.70 m

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		60 100 200			

Depth, *Level* (Thickness) | Legend | Backfill/ Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH215A

Borehole Log

Soil Mechanics

Drilled SB **Logged** BS **Checked** JT	**Start** 04/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Hydreq Minor Open hole drilling. Rotary core drilling (PWF size) using water flush.	**Depth from** 0.00m **to** 30.00m **Diameter** 121mm **Casing Depth** 8.00m	**Ground Level** +90.97 mOD **Coordinates** E 434768.80 **National Grid** N 406336.10 **Chainage**

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.00-21.50	87 23 0	NI 30 50			
21.50-23.50	50 35 25	100 250 300			
				04/04/2008 8.00	

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely spaced, planar, smooth. 20.40-20.50 m soft clay			
	20.70 *+70.27*		
Weak, locally very weak, thinly laminated dark grey and black MUDSTONE. Fractures are subhorizontal, very closely spaced, planar, rough. 21.20-21.30 m dark grey and black mudstone	(0.60)		
	21.30 *+69.67*		
Very weak black vitreous COAL. Fractures are subhorizontal, very closely spaced, planar, rough. 21.30-21.50 m AZCL	(0.40)		
	21.70 *+69.27*		
21.50-21.70 m NI very gravelly clay Very weak thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, closely to medium spaced, planar, rough. Locally grading to firm clay. 21.70-22.70 m AZCL	(1.80)		
	23.50 *+67.47*		
MUDSTONE/siltstone bands (Foreman's description)	(6.50)		
EXPLORATORY HOLE ENDS AT 30.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
23.50	30.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH215A

Borehole Log

Soil Mechanics

Drilled MB **Logged** BS **Checked** JT	**Start** 01/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Mobile Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** to **Diameter** **Casing Depth** 0.00m 30.00m 121mm 10.00m	**Ground Level** +91.67 mOD **Coordinates** E 434771.10 **National Grid** N 406351.30 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			01/04/2008	
			2.00	0.00
Depth	**Type & No**	**Records**	**Date Casing**	**Time Water**

Strata

Description	Depth, *Level* (Thickness)
Inspection pit.	(1.20)
	1.20 *+90.47*
Brown CLAY. (Foreman's description)	(0.80)
	2.00 *+89.67*
Brown weathered SANDSTONE. (Foreman's description)	(5.20)
	7.20 *+84.47*
Grey MUDSTONE. (Foreman's description)	(3.25)
Stratum continues to 10.45 m	

Legend

Backfill/ Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
1.20	15.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH217

Borehole Log

Soil Mechanics

Drilled MB **Logged** BS **Checked** JT	**Start** 01/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Mobile Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 30.00m	**Diameter** 121mm	**Casing Depth** 10.00m	**Ground Level** +91.67 mOD **Coordinates** E 434771.10 **National Grid** N 406351.30 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			02/04/2008	0800
			2.00	2.40
15.00-16.70	100 76 41	5 50 130		
16.70-17.70	100 80 51			
17.70-19.10	100 60 32			
		NI 70 240	02/04/2008 10.00	
		Flush: 15.00-23.30 polymer, 100 %	03/04/2008 10.00	0800 4.10
19.10-20.30	92 53 11			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description
(Continued from Sheet 1)

Grey MUDSTONE.
(Foreman's description)

10.45 *+81.22*

(0.55)

COAL.
(Foreman's description)

11.00 *+80.67*

Grey MUDSTONE.
(Foreman's description)

(4.00)

15.00 *+76.67*

Weak to medium strong thinly laminated dark grey SILTSTONE. Fractures are subhorizontal, extremely closely to closely spaced, planar, rough.

15.30-15.46 m very weak siltstone

15.75-15.90 m 1 No. 90 deg undulating rough fracture

16.00-16.20 m very weak siltstone

16.20-16.50 m locally grading to fine grained sandstone

(1.90)

16.90 *+74.77*

Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, smooth.

16.70-16.80 m NI

17.70-17.83 m hard clay

18.00-18.05 m 1 No. undulating rough fracture

18.74-18.90 m NI

19.00-19.10 m very weak black mudstone

19.10-19.20 m AZCL

19.30-19.50 m NI

19.90-20.30 m

(4.10)

Stratum continues to 21.00 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH217

Borehole Log

Soil Mechanics

Drilled MB **Logged** BS **Checked** JT	**Start** 01/04/2008 **End** 04/04/2008	**Equipment, Methods and Remarks** Mobile Rotary open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 30.00m **Diameter** 121mm **Casing Depth** 10.00m	**Ground Level** +91.67 mOD **Coordinates** E 434771.10 **National Grid** N 406351.30 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.30-21.80	100 25 7	NI 120 120			
21.80-23.30	100 75 62	NI 120 160			
23.30-24.00	100 83 69	60 130 260	Flush: 23.30-30.00 polymer, 75 %	03/04/2008 10.00 04/04/2008 10.00 04/04/2008 10.00	1.00 0800

Strata

Description (Continued from Sheet 2)		Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal, very closely to medium spaced, planar, smooth.	dark grey and black 20.00-20.15 m very weak mudstone 20.25-20.30 m 1 No. 90 deg planar smooth fracture 20.30-20.43 m			
Very weak black vitreous COAL. Fractures are subhorizontal, closely spaced, undulating, rough.	very weak black mudstone 20.43-20.50 m stiff gravelly clay 20.54-20.63 m 1 No. 90 deg undulating rough fracture	21.00 *+70.67* (0.70)		
Weak thinly laminated light grey MUDSTONE. Fractures are subhorizontal, closely spaced, undulating, rough.	20.82-20.95 m very weak carbonaceous mudstone 21.06-21.31 m 1 No. 90 deg undulating rough fracture	21.70 *+69.97* (0.90)		
Medium strong to strong thinly laminated light grey SILTSTONE. Fractures are horizontal, closely to medium spaced, planar, rough.	21.80-21.91 m 1 No. 80-90 deg undulating rough fracture 21.90-22.50 m locally grading to firm gravelly clay	22.60 *+69.07* (1.40)		
Grey silty MUDSTONE. (Foreman's description)		24.00 *+67.67* (6.00)		
EXPLORATORY HOLE ENDS AT 30.00 m				

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
24.00	30.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

BH217

Borehole Log

Soil Mechanics

Drilled DS **Logged** KW **Checked** JT	**Start** 07/04/2000 **End** 08/04/2008	**Equipment, Methods and Remarks** Comacchio Open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** to **Diameter** **Casing Depth** 0.00m 30.00m 121mm 16.00m	**Ground Level** +92.14 mOD **Coordinates** E 434762.10 **National Grid** N 406370.00 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam over hardcore. (MADE GROUND) (Foreman's description)	(0.70)		
	0.70 *+91.44*		
Yellow and brown sandy CLAY with mudstone. (Foreman's description)	(6.60)		
	7.30 *+84.84*		
MUDSTONE. (Foreman's description)	(2.10)		
	9.40 *+82.74*		
COAL. (Foreman's description)	(0.80)		
Stratum continues to 10.20 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit.
1.20	16.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Borehole

BH218

Borehole Log

Soil Mechanics

Drilled DS **Logged** KW **Checked** JT	**Start** 07/04/2000 **End** 08/04/2008	**Equipment, Methods and Remarks** Comacchio Open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m **to** 30.00m **Diameter** 121mm **Casing Depth** 16.00m	**Ground Level** +92.14 mOD **Coordinates** E 434762.10 **National Grid** N 406370.00 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
16.00-17.10	67 55 12		07/04/2008 16.00	
			08/04/2008 16.00	0800 4.30
17.10-18.35	80 45 0	20 80 130		
18.35-19.85	100 73 30	NI 15 45		

Strata

Description (Continued from Sheet 1)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
COAL. (Foreman's description)	10.20 *+81.94*		
MUDSTONE. (Foreman's description)	(5.80)		
Weak to medium strong thinly laminated grey MUDSTONE. Fractures are subhorizontal, very closely to closely spaced, planar and smooth. 16.17-16.30 m locally NI 16.20 m 1 No. 90-80 deg fracture planar smooth 16.74-17.10 m AZCL	16.00 *+76.14*		
17.45-17.50 m locally strong 17.50-17.92 m locally NI 17.92-18.06 m 1 No. 90 deg fracture planar smooth 18.06-18.10 m firm to stiff grey very gravelly clay 18.10-18.35 m AZCL 18.53-18.60 m 1 No. 90 deg fracture planar smooth	(3.02)		
Weak black vitreous COAL. Fractures are subhorizontal, extremely closely to very closely spaced, planar and rough. 18.60-18.65 m NI gravelly clay 18.93-19.02 m firm dark grey and black slightly gravelly clay	19.02 *+73.12* (0.41) 19.43 *+72.71*		
Weak to medium strong thinly laminated MUDSTONE. Fractures are subhorizontal, 19.04-19.30 m 1 No. 90 deg fracture planar rough			
Stratum continues to 21.10 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

BH218

Borehole Log

Soil Mechanics

Drilled DS **Logged** KW **Checked** JT	**Start** 07/04/2000 **End** 08/04/2008	**Equipment, Methods and Remarks** Comacchio Open hole drilling. Rotary core drilling (PWF size) using polymer flush.	**Depth from** 0.00m	**to** 30.00m	**Diameter** 121mm	**Casing Depth** 16.00m

Ground Level +92.14 mOD
Coordinates E 434762.10
National Grid N 406370.00
Chainage

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
19.85-21.10	86 69 11	60 90 160			
			Flush: 16.00-30.00 Polymer, 100 %		
				08/04/2008 16.00	

Strata

Description (Continued from Sheet 2)	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
closely spaced, undulating and rough. :: 19.68m - 19.68-19.80 m moderately strong to strong light grey sandstone	(1.67)		
SANDSTONE. (Foreman's description)	21.10 *+71.04*		
	(8.90)		
EXPLORATORY HOLE ENDS AT 30.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
21.00	30.00	Open hole drilling.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2
Project No. A8017
Carried out for 1249 Regeneration Partnership LLP

Borehole
BH218

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 13/03/2008 **End** 13/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 2.00m – 87mm 2.00m – 3.00m – 77mm 3.00m – 4.00m – 67mm 4.00m – 4.60m – 57mm	**Ground Level** - **Coordinates** - **National Grid** - **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00	L 1			
0.70-0.80	ES 1A			
1.00-2.00	L 2			
2.00-3.00	L 3			
2.70-2.80	ES 2A			
3.00-4.00	L 4			
4.00-4.60	L 5			
4.40-4.60	ES 3A		13/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.40)		
(MADE GROUND)			
(Foreman's description)	0.40		
Light grey and cream slightly silty slightly sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)	(2.10)		
Firm to stiff dark grey locally mottled orange and brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium of mudstone. (MADE GROUND)	2.50 (0.50)		
Firm locally soft brown slightly sandy gravelly CLAY. Gravel is angular fine to medium of various lithologies including brick, sandstone and concrete. (MADE GROUND)	3.00 (1.00)		
Firm to stiff thinly laminated dark grey locally mottled black CLAY. 4.20-4.30 m strong hydrocarbon odour and silty sheen	4.00 (0.60)		
EXPLORATORY HOLE ENDS AT 4.60 m	4.60		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete coring.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS208A

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 25/02/2008 **End** 25/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.90m / 87mm 1.90m / 2.90m / 77mm 2.90m / 3.90m / 67mm	**Ground Level** +94.44 mOD **Coordinates** E 434757.50 **National Grid** N 406265.10 **Chainage**	

Samples and Tests

Strata

Depth	Type & No	Records	Date Casing / Time Water	Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
				Monoblock paving	0.05 *+94.39*		
				(MADE GROUND)	0.10 *+94.34*		
					0.20 *+94.24*		
0.50-1.00	ES 1			Brown medium SAND (MADE GROUND)	(0.90)		
0.90-1.30	L 1			Grey GRAVEL. Gravel is subangular to angular fine to coarse of limestone. (MADE GROUND)	1.10 *+93.34*		
1.50	ES 2			Brown sandy GRAVEL. Gravel is subrounded to subangular fine to medium of brick, concrete, sandstone and occasional slag and metal. (MADE GROUND)	(0.50) 1.60 *+92.84*		
1.90-2.40	L 2						
2.30	ES 3			Firm grey slightly gravelly CLAY. Gravel is subangular fine to medium of brick and coal. (MADE GROUND)	(0.90) 2.50 *+91.94*		
2.90-3.20	L 3			Firm grey mottled brown slightly gravelly CLAY. Gravel is subangular fine to medium of coal and mudstone.	(0.30) 2.80 *+91.64*		
				Moderately weak black vitreous COAL. Recovered as angular fine to medium gravel.	(1.10)		
3.60	ES 4		25/02/2008 dry	Weak light grey stained orange on surfaces thinly laminated MUDSTONE.			
				EXPLORATORY HOLE ENDS AT 3.90 m	3.90 *+90.54*		

Depth	Type & No	Records	Date Casing / Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
3.90		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS221

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 25/02/2008 **End** 25/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m – 2.00m – 87mm 2.00m – 3.00m – 77mm 3.00m – 4.00m – 67mm 4.00m – 4.40m – 57mm	**Ground Level** +94.55 mOD **Coordinates** E 434746.70 **National Grid** N 406267.00 **Chainage**

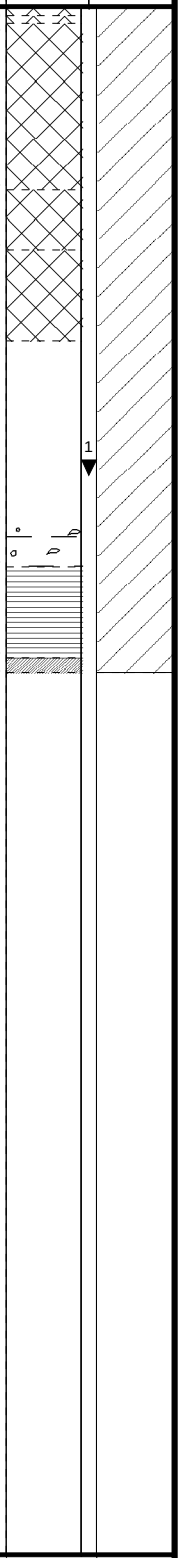
Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50	ES 1			
1.00-1.30	L 1			
1.50	ES 2			
2.00-2.80	L 2			
3.00-3.60	L 3			
3.80	ES 3			
4.00-4.30	L 4		25/02/2008	

Strata

Description	Depth, *Level* (Thickness)
Monoblock paving (MADE GROUND)	0.05 *+94.50* 0.10 *+94.45*
Brown medium SAND (MADE GROUND)	(1.10)
Brown sandy GRAVEL. Gravel is subrounded to subangular fine to coarse of brick, concrete and sandstone. (MADE GROUND)	1.20 *+93.35*
Grey slightly clayey GRAVEL. Gravel is subangular to angular fine to medium of limestone. (MADE GROUND)	(0.40) 1.60 *+92.95*
Soft grey mottled black slightly gravelly CLAY. Gravel is subangular fine to medium of brick and coal. (MADE GROUND)	(0.60) 2.20 *+92.35*
No Recovery.	(1.20)
Soft grey slightly gravelly silty CLAY. Gravel is subangular medium of mudstone.	3.40 *+91.15* (0.30) 3.70 *+90.85*
Weak light grey thinly laminated MUDSTONE	(0.60)
Moderately weak black vitreous COAL. Recovered as angular medium gravel.	4.30 *+90.25* 4.40 *+90.15*
EXPLORATORY HOLE ENDS AT 4.40 m	

Legend / Backfill/Instruments



Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
4.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Scale 1:50

Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS222

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 25/02/2008 **End** 25/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m / 2.00m / 87mm 2.00m / 2.40m / 77mm	**Ground Level** +95.52 mOD **Coordinates** E 434736.60 **National Grid** N 406233.60 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-1.00	ES 1			
1.00-1.10	L 1			
1.50	ES 2			
2.00-2.30	L 2		25/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Monoblock paving (MADE GROUND)	0.05 *+95.47* 0.10 *+95.42* (0.40)		
Brown medium SAND (MADE GROUND)	0.50 *+95.02* (0.50)		
Grey sandy GRAVEL. Gravel is subangular to angular fine to medium of limestone. (MADE GROUND)	1.00 *+94.52*		
Brown sandy GRAVEL. Gravel is subrounded fine to coarse of brick, concrete and sandstone with occasional slag and wire. (MADE GROUND)	(1.40)		
Light brown sandy GRAVEL. Gravel is subrounded medium to coarse with occasional cobbles of sandstone and concrete. (MADE GROUND)	2.40 *+93.12*		
EXPLORATORY HOLE ENDS AT 2.40 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
2.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS223

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 26/02/2008 **End** 26/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 5.00m – 57mm	**Ground Level** +94.28 mOD **Coordinates** E 434761.40 **National Grid** N 406281.40 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.20-0.30	L 1			
0.40	ES 1			
1.00-2.00	L 2			
2.00-2.30	L 3			
2.40	ES 2			
3.00-5.00	ES 3			
3.00-3.30	L 4			
4.00-5.00	L 5			
			26/02/2008	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE (MADE GROUND)	0.20 *+94.08*		
Grey slightly sandy clayey GRAVEL. Gravel is subrounded to subangular fine to coarse with occasional cobbles of brick, sandstone, concrete and occasional slag and coal. (MADE GROUND)	(0.50) 0.70 *+93.58* (0.30) 1.00 *+93.28*		
Concrete recovered as subrounded coarse gravel. (MADE GROUND)			
Brown to black sandy GRAVEL. Gravel is subrounded fine to coarse of vesicular slag with occasional brick and concrete. (MADE GROUND)	(4.00)		1
EXPLORATORY HOLE ENDS AT 5.00 m	5.00 *+89.28*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	0.20	Concrete core 150mm.
5.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project	**BARNSLEY MARKETS PHASE 2**
Project No.	**A8017**
Carried out for	**1249 Regeneration Partnership LLP**

Borehole

WS224

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 26/02/2008 **End** 26/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 4.00m – 57mm	**Ground Level** +94.36 mOD **Coordinates** E 434769.30 **National Grid** N 406266.60 **Chainage**

Samples and Tests

Strata

Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
0.10-0.40	L 1				Reinforced CONCRETE (MADE GROUND)	0.20 *+94.16* (0.30)		
0.60	ES 1				Light brown sandy GRAVEL. Gravel is subrounded to subangular fine of sandstone and limestone. (MADE GROUND)	0.50 *+93.86*		
1.00-1.40	L 2				Brown slightly clayey sandy GRAVEL. Gravel is subrounded to subangular fine to coarse with occasional cobbles of brick, concrete, sandstone and occasional timber. (MADE GROUND)	(0.90) 1.40 *+92.96* 1.60 *+92.76*		
2.00-3.00	L 3				Dark brown slightly gravelly fine to medium SAND. Gravel is subangular fine of brick. (MADE GROUND)			
2.40-2.70	ES 2				Soft becoming firm slightly sandy gravelly CLAY. Gravel is subrounded to subangular fine to coarse of sandstone and concrete with occasional brick and coal fragments. (MADE GROUND)	(1.50)		
3.00-3.65	L 4					3.10 *+91.26*		
3.40-3.60	ES 3				Soft dark grey occasional brown slightly gravelly CLAY. Gravel is subangular medium of mudstone.	(0.60)		
3.70-4.00	ES 4		26/02/2008	dry	Weak black COAL. Recovered as angular fine gravel. 3.70-3.80 m slightly clayey	3.70 *+90.66* (0.30)		
					EXPLORATORY HOLE ENDS AT 4.00 m	4.00 *+90.36*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.20	Concrete core 150mm.
4.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS225

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 26/02/2008 **End** 26/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 4.00m – 57mm	**Ground Level** +94.38 mOD **Coordinates** E 434786.60 **National Grid** N 406238.20 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00	L 1			
0.60-1.10	ES 1			
1.00-2.00	L 2			
2.00-2.20	L 3			
2.50	ES 2			
3.00-3.70	L 4			
3.40-3.80	ES 3			
			26/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE (MADE GROUND)	(0.30) 0.30 *+94.08*		
Light brown sandy GRAVEL. Gravel is subrounded to subangular fine to coarse of concrete, brick and sandstone. (MADE GROUND)	(1.00) 1.30 *+93.08*		
No Recovery	(0.40) 1.70 *+92.68*		
Light brown slightly sandy GRAVEL. Gravel is rounded fine to medium pebbles. (MADE GROUND)	1.90 *+92.48*		
Light brown sandy GRAVEL. Gravel is subrounded to subangular fine to coarse of concrete, brick and sandstone. (MADE GROUND)	2.10 *+92.28*		
Stiff grey to brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to subangular of concrete, brick and sandstone. (MADE GROUND) 3.30-3.60 m slightly sandy gravel of rounded fine to medium pebbles	(1.90)		
EXPLORATORY HOLE ENDS AT 4.00 m	4.00 *+90.38*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 150mm.
4.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS226

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 26/02/2008 **End** 26/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 3.00m / 67mm	**Ground Level** +94.78 mOD **Coordinates** E 434737.80 **National Grid** N 406274.20 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-0.50	ES 1			
0.50-1.00	L 1			
0.70	ES 2			
1.00-1.45	L 2			
1.50	ES 3			
2.00-2.70	L 3			
2.00-2.20	ES 4			
			26/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Monoblock paving (MADE GROUND)	0.05 *+94.73* 0.10 *+94.68* (0.40)		
Brown medium SAND (MADE GROUND)	0.50 *+94.28* 0.60 *+94.18*		
Brick recovered as subangular cobbles (MADE GROUND)	(0.40) 1.00 *+93.78*		
Concrete recovered as subrounded coarse gravel. (MADE GROUND)	(0.40) 1.40 *+93.38*		
Brown sandy GRAVEL. Gravel is subangular fine to coarse with occasional cobbles of brick, concrete and sandstone. (MADE GROUND)	1.60 *+93.18* (0.90)		
No Recovery.			
Dark brown sandy GRAVEL. Gravel is subrounded fine to medium of vesicular slag. (MADE GROUND)	2.50 *+92.28* (0.30) 2.80 *+91.98*		
Soft becoming very soft dark grey CLAY with pockets of coal dust and occasional brick fragments. (MADE GROUND)	3.00 *+91.78*		
Soft grey mottled brown CLAY with occasional subrounded fine sandstone.			
Weak black slightly shaley COAL. Recovered as slightly clayey angular fine gravel.			
EXPLORATORY HOLE ENDS AT 3.00 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS227

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 26/02/2008 **End** 26/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 3.00m / 87mm 3.00m / 3.40m / 77mm	**Ground Level** +95.62 mOD **Coordinates** E 434720.60 **National Grid** N 406280.20 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-0.70	ES 1			
0.70-1.00	L 1			
1.00-1.20	ES 2			
1.00-1.55	L 2			
1.80	ES 3			
2.00-2.30	L 3			
2.80-3.00	ES 4			
3.00-3.40	L 4		26/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Monoblock paving (MADE GROUND)	0.05 *+95.57* 0.10 *+95.52*		
Brown medium SAND (MADE GROUND)			
Brown sandy GRAVEL. Gravel is subrounded to subangular fine to coarse with occasional cobbles of brick, concrete, slag and sandstone. (MADE GROUND)	(1.40)		
Dark brown fine to medium SAND (MADE GROUND)	1.50 *+94.12* (0.50)		
Brown gravelly SAND. Gravel is subangular of brick and concrete cobbles. (MADE GROUND)	2.00 *+93.62* 2.20 *+93.42*		
Soft becoming firm grey stained black and orange gravelly CLAY. Gravel is subrounded to subangular fine to medium of ironstone.	(0.90)		
Stiff grey stained orange gravelly CLAY. Gravel is weak angular fine to coarse of mudstone.	3.10 *+92.52* (0.30)		
EXPLORATORY HOLE ENDS AT 3.40 m	3.40 *+92.22*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
3.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project BARNSLEY MARKETS PHASE 2

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Borehole

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Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 27/02/2008 **End** 27/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 3.00m / 67mm 3.00m / 3.40m / 57mm	**Ground Level** +95.87 mOD **Coordinates** E 434713.90 **National Grid** N 406270.30 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.50-0.80 0.60-1.00	ES 1 L 1			
1.00-1.85	L 2			
1.80	ES 2			
2.00-2.25	L 3			
2.60-2.90	ES 3			
3.00-3.40	L 4			
3.20-3.40	ES 4		27/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Monoblock paving (MADE GROUND)	0.05 *+95.82* 0.10 *+95.77*		
Brown medium SAND (MADE GROUND)			
Brown sandy GRAVEL. Gravel is subrounded to subangular fine to coarse with occasional cobbles of brick, concrete, vesicular slag and sandstone. (MADE GROUND)	(2.20)		
Soft grey to black gravelly CLAY. Gravel is weak angular fine coal.	2.30 *+93.57* 2.40 *+93.47*		
Grey stained orange on surfaces sandy in parts clayey GRAVEL. Gravel is weak subangular to angular fine to coarse of mudstone.	(0.50) 2.90 *+92.97*		
Soft grey to black slightly sandy gravelly CLAY. Gravel is weak angular fine coal.	(0.30) 3.20 *+92.67* 3.40 *+92.47*		
Weak grey stained orange on surfaces thinly laminated MUDSTONE. Recovered as angular coarse gravel.			
EXPLORATORY HOLE ENDS AT 3.40 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
3.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Scale 1:50

Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 27/02/2008 **End** 27/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 1.60m / 77mm 1.60m / 2.00m / 57mm	**Ground Level** +95.40 mOD **Coordinates** E 434722.40 **National Grid** N 406260.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-0.50	ES 1			
0.50-1.00	L 1			
0.80	ES 2			
1.00-1.60	L 2			
1.60-2.00	L 3		27/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Monoblock paving (MADE GROUND)	0.05 *+95.35* 0.10 *+95.30*		
Brown medium SAND. (MADE GROUND)	(0.80)		
Grey sandy GRAVEL. Gravel is subangular to subrounded fine to coarse with occasional cobbles of brick, concrete, sandstone and occasional metalliferous slag. (MADE GROUND)	0.90 *+94.50*		
Subangular brick and concrete COBBLES. (MADE GROUND)	(1.10)		
EXPLORATORY HOLE ENDS AT 2.00 m	2.00 *+93.40*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
2.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

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Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 27/02/2008 **End** 27/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 2.00m / 87mm 2.00m / 5.00m / 77mm	**Ground Level** +94.35 mOD **Coordinates** E 434751.00 **National Grid** N 406299.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.20-0.65	L 1			
0.50-0.70	ES 1			
1.00-2.00	L 2			
2.00-2.60	L 3			
2.30-2.60	ES 2			
3.00-3.85	L 4			
3.60-3.80	ES 3			
4.00-5.00	L 5			
4.70-4.90	ES 4		27/02/2008	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE (MADE GROUND)	0.20 *+94.15* 0.30 *+94.05*		
Brown sandy GRAVEL. Gravel is subangular fine to medium of sandstone. (MADE GROUND)	(0.60)		
Brown sandy GRAVEL. Gravel is subangular to subrounded concrete, brick, sandstone and occasional slag and wire. (MADE GROUND)	0.90 *+93.45*		
Light brown sandy GRAVEL. Gravel is subangular fine to coarse with occasional cobbles of sandstone and occasional brick and slag. (MADE GROUND)	(2.50)		
3.00 m wet			1
Soft brown to grey gravelly CLAY. Gravel is subangular medium to coarse of sandstone and occasional brick fragments. Hydrocarbon odour. (MADE GROUND)	3.40 *+90.95* (0.60) 4.00 *+90.35*		
Brown slightly sandy GRAVEL. Gravel is subangular medium to coarse of sandstone. (MADE GROUND)	(0.50) 4.50 *+89.85*		
Soft brown slightly sandy gravelly CLAY. Gravel is subangular fine to coarse of sandstone and mudstone.	(0.50) 5.00 *+89.35*		
EXPLORATORY HOLE ENDS AT 5.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
5.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project	**BARNSLEY MARKETS PHASE 2**
Project No.	**A8017**
Carried out for	**1249 Regeneration Partnership LLP**

Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 27/02/2008 **End** 27/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 3.00m / 77mm 3.00m / 4.00m / 67mm	**Ground Level** +94.48 mOD **Coordinates** E 434747.40 **National Grid** N 406247.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.10-1.00	L 1			
0.50-0.70	ES 1			
1.00	ES 2			
1.00-1.50	L 2			
2.00-2.85	L 3			
2.40-2.70	ES 3			
3.00-3.40	L 4			
3.70-4.00	ES 4		27/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE.	0.10 *+94.38* 0.20 *+94.28*		
Brown sandy GRAVEL. Gravel is subangular fine to medium of sandstone. (MADE GROUND)	(0.80)		
Brown sandy GRAVEL. Gravel is subangular to subrounded fine to coarse of concrete, brick, sandstone and occasional slag and slate. (MADE GROUND)	1.00 *+93.48* (0.90)		
Brown slightly clayey sandy GRAVEL. Gravel is rounded fine to coarse of pebbles and occasional subrounded fine to medium sandstone and brick. (MADE GROUND)	1.90 *+92.58* 2.10 *+92.38*		
Soft black gravelly CLAY. Gravel is angular fine to medium coal.	(0.70)		
Weak black vitreous COAL. Recovered as angular fine to medium gravel.	2.80 *+91.68*		
Stiff grey stained orange on surfaces CLAY.	3.00 *+91.48* (0.30)		
No recovery.	3.30 *+91.18*		
Weak grey stained orange on surfaces thinly laminated MUDSTONE.	(0.70)		
EXPLORATORY HOLE ENDS AT 4.00 m	4.00 *+90.48*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
4.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** **Checked** JT	**Start** 14/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm / 1.00m 1.00m / 2.00m / 77mm / 2.00m 2.00m / 4.00m / 67mm / 4.00m 4.00m / 4.50m / 57mm / 4.50m	**Ground Level** +94.46 mOD **Coordinates** E 434769.80 **National Grid** N 406244.40 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-1.00	L 1			
0.80-0.90	ES 1			
1.00-2.00	L 2			
2.00-3.00	L 3			
2.50-2.60	ES 2			
3.00-4.00	L 4			
3.90-4.50	ES 3			
4.00-4.50	L 5		14/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (Foreman's Description)	0.20 *+94.26*		
Rubble. (Foreman's Description)	(0.40)		
Hardcore. (Foreman's Description).	0.60 *+93.86*		
	(0.60)		
Dark grey brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of various lithologies including brick, coal and sandstone. (MADE GROUND)	1.20 *+93.26* 1.40 *+93.06* 1.60 *+92.86*		
Firm to stiff dark grey brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, coal and sandstone. (MADE GROUND)			
Firm to stiff grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone, mudstone and quartz. 3.00-4.50 m Very stiff.	(2.90)		
EXPLORATORY HOLE ENDS AT 4.50 m	4.50 *+89.96*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
4.50		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

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Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 28/02/2008 **End** 28/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 2.00m – 87mm 2.00m – 3.00m – 77mm 3.00m – 4.00m – 67mm 4.00m – 5.00m – 57mm	**Ground Level** +94.42 mOD **Coordinates** E 434765.00 **National Grid** N 406227.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-0.60	ES 1			
1.00-1.25	L 1			
1.50-1.60	ES 2			
2.00-3.00	L 2			
2.60	ES 3			
3.00-3.40	L 3			
4.00-5.00	L 4			
4.50-4.80	ES 4			
			28/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE	0.10 *+94.32*		
(MADE GROUND)	0.20 *+94.22*		
Brown sandy GRAVEL. Gravel is subangular fine to medium of sandstone. (MADE GROUND)	(0.80)		
Brown sandy GRAVEL. Gravel is subangular to subrounded fine to coarse with occasional cobbles of concrete and brick. (MADE GROUND)	1.00 *+93.42*		
Stiff brown slightly sandy gravelly CLAY. Gravel is subrounded to subangular fine to coarse with occasional cobbles of sandstone, mudstone and fine angular coal. (MADE GROUND)	(2.50)		
Stiff grey stained orange on surfaces gravelly CLAY. Gravel is weak angular fine to coarse of mudstone.	3.50 *+90.92*		
	(1.50)		
EXPLORATORY HOLE ENDS AT 5.00 m	5.00 *+89.42*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
5.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

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Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 29/02/2008 **End** 29/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Description supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 4.00m – 57mm	**Ground Level** +94.46 mOD **Coordinates** E 434780.50 **National Grid** N 406219.40 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-0.60	ES 1			
0.80-1.00	L 1			
0.90	ES 2			
1.00-2.00	L 2			
2.00-2.50	L 3			
3.00-3.44	L 4			
3.50-4.00	ES 3			
			29/02/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE (MADE GROUND)	0.20 *+94.26*		
Dark brown sandy GRAVEL. Gravel is subangular to subrounded fine to coarse with occasional cobbles of brick, concrete and sandstone and occasional coal and slag. (MADE GROUND)	(1.00)		
Brown sandy GRAVEL. Gravel is subangular to subrounded fine to coarse with occasional cobbles of concrete and brick. (MADE GROUND)	1.20 *+93.26*		
No Recovery.	(0.80)		
Firm light brown sandy gravelly CLAY. Gravel is fine to coarse subangular of sandstone and mudstone. (MADE GROUND)	2.00 *+92.46*		
Very weak light brown stained black and orange on surfaces thinly laminated MUDSTONE.	(0.40)		
EXPLORATORY HOLE ENDS AT 4.00 m	2.40 *+92.06*		
	(0.60)		
	3.00 *+91.46*		
	(1.00)		
	4.00 *+90.46*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
4.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 29/02/2008 **End** 29/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 3.00m / 67mm	**Ground Level** +90.57 mOD **Coordinates** E 434632.80 **National Grid** N 406347.10 **Chainage**	

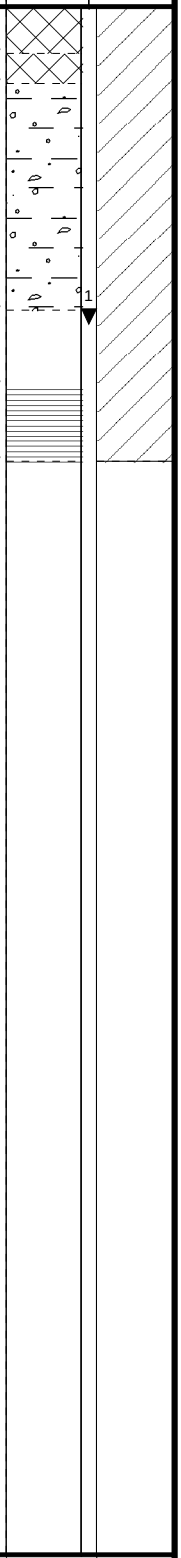
Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
0.50-0.60	ES 1			
1.00-2.00	L 2			
1.30-1.40	ES 2			
2.00-3.00	L 3			
2.60-2.70	ES 3		29/02/2008	

Strata

Description	Depth, *Level* (Thickness)
Reinforced CONCRETE (MADE GROUND)	(0.30) 0.30 *+90.27*
Dark brown slightly sandy GRAVEL. Gravel is subangular to subrounded medium to coarse of limestone. (MADE GROUND)	0.50 *+90.07*
Soft brown sandy gravelly CLAY. Gravel is subangular to subrounded occasionally rounded fine to coarse of sandstone and mudstone with occasional angular fine to medium coal and ironstone.	(1.50)
No Recovery.	2.00 *+88.57* (0.50) 2.50 *+88.07*
Very weak grey stained orange on surfaces thinly laminated MUDSTONE.	(0.50) 3.00 *+87.57*
EXPLORATORY HOLE ENDS AT 3.00 m	

Legend / Backfill/ Instruments



Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	2.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** **Checked** JT	**Start** 29/02/2008 **End** 29/02/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling Descriptions supplied by Wardell Armstrong	**Depth from / to / Diameter / Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 5.45m – 57mm	**Ground Level** +91.03 mOD **Coordinates** E 434683.90 **National Grid** N 406349.30 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.20-1.00	L 1			
0.70-0.80	ES 1			
1.00-1.45	SPT S	N=15 (2,10/5,3,3,4)		dry
1.00-1.45	D 2			
1.00-2.00	L 3			
2.00-3.00	L 4			
2.50-2.70	ES 2			
3.00-4.00	L 5			
4.00-5.00	L 6			
5.00-5.45	SPT S	N=48 (4,5/10,8,10,20)		4.00
5.00-5.45	D 7		29/02/2008	

Strata

Description	Depth, *Level* (Thickness)
Reinforced CONCRETE (MADE GROUND)	(0.40)
	0.40 *+90.63*
Soft grey slightly sandy gravelly CLAY. Gravel is subangular fine to medium of sandstone and mudstone. (MADE GROUND)	(0.60)
	1.00 *+90.03*
No Returns.	(0.40)
	1.40 *+89.63*
Light brown sandy GRAVEL. Gravel is subangular fine to coarse of brick, concrete and sandstone. (MADE GROUND)	(0.30)
	1.70 *+89.33*
Firm grey slightly gravelly CLAY. Gravel is subangular to angular fine to medium of mudstone with occasional coal and rounded medium to coarse ironstone gravel.	(0.80)
	2.50 *+88.53*
Very soft brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to medium of sandstone.	2.70 *+88.33*
	2.90 *+88.13*
Brown slightly sandy GRAVEL. Gravel is subrounded to subangular fine to medium of sandstone.	(0.60)
	3.50 *+87.53*
Soft brown sandy gravelly CLAY. Gravel is subangular fine to coarse of sandstone and mudstone with occasional coal.	3.70 *+87.33*
Brown sandy slightly clayey GRAVEL. Gravel is subrounded to subangular fine to medium of sandstone.	(1.75)
Firm brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded of sandstone and mudstone with some coal.	
EXPLORATORY HOLE ENDS AT 5.45 m	5.45 *+85.58*

Legend / Backfill/ Instruments: 1

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	4.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	0.40	Concrete core 200mm.
5.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 03/03/2008 **End** 03/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.33m – 200mm 0.33m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm	**Ground Level** +91.22 mOD **Coordinates** E 434714.40 **National Grid** N 406305.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.33-1.00	L 1			
0.50-0.60	ES 1A			
1.00-2.00	L 2			
1.40-1.50	ES 2A			
2.00-3.00	L 3			
2.70-2.80	ES 3A		03/03/2008	
2.90-3.00	ES 4			dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.32)		
(MADE GROUND)	0.32 *+90.90*		
Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, sandstone, mudstone, clinker and coal. (MADE GROUND)	(1.50)		
0.70-0.80 m orange and brown mottled black slightly clayey gravelly sand. Gravel is angular to subangular fine to coarse of sandstone			
0.87 m hydrocarbon odour	1.82 *+89.40*		
Soft dark brown and grey mottled black slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of siltstone and mudstone. Occasional rootlets.	(0.38)		
1.60 m becoming very gravelly	2.20 *+89.02*		
1.73-1.78 m very sandy			
1.78-1.82 m black weakly cemented sand of tar. Hydrocarbon odour	(0.80)		
Very weak laminated light grey to dark grey mottled black MUDSTONE with liquid tar on laminated surfaces. Strong hydrocarbon odour.			
2.00 m becoming very gravelly	3.00 *+88.22*		
2.53-2.58 m grey angular to subangular medium gravel of mudstone			
EXPLORATORY HOLE ENDS AT 3.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.33	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS238

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 03/03/2008 **End** 03/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.32m – 200mm 0.32m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm	**Ground Level** +91.20 mOD **Coordinates** E 434724.40 **National Grid** N 406312.90 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.32-1.00	L 1			
0.80	ES 1A			
1.00-2.00	L 2			
1.50-1.70	ES 2A			
2.00-3.00	L 3			
			03/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.32)		
(MADE GROUND)	0.32 *+90.88*		
Soft to firm light brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, sandstone and coal. (MADE GROUND)	(1.28)		
Light brown very sandy GRAVEL. Gravel is angular to subangular fine to coarse of brick, mudstone and sandstone. Occasional fine to coarse gravel size pockets of brown sandy clay. (MADE GROUND) — 1.70-1.97 m firm brown sandy gravelly clay. Gravel is angular to subangular fine to coarse of brick, sandstone, clinker, coal, tar and mudstone.	1.60 *+89.60* (1.40)		
EXPLORATORY HOLE ENDS AT 3.00 m	3.00 *+88.20*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.32	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS239

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 03/03/2008 **End** 03/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.34m – 200mm 0.34m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 6.00m – 57mm	**Ground Level** +91.19 mOD **Coordinates** E 434722.80 **National Grid** N 406313.40 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.34-1.00	L 1			
0.50-0.60	ES 1A			
1.00-2.00	L 2			
2.00-3.00	L 3			
2.50-2.70	ES 2A			
3.00-4.00	L 4			
3.50-4.00	ES 3A			
4.00-5.00	L 5			
5.00-6.00	L 6			
5.30-5.90	ES 4A		03/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.34)		
(MADE GROUND)	0.34 *+90.85*		
Soft light brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including brick, mudstone and sandstone.	(0.43)		
(MADE GROUND)	0.77 *+90.42*		
Grey sandy GRAVEL. Gravel is angular to subangular fine to coarse of various lithologies including mudstone, clinker and coal. 1.65-1.70 m yellow coarse sand	(0.88)		
(MADE GROUND)	1.65 *+89.54*		
Soft light brown slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including brick, sandstone, mudstone, clinker and tar. Slight hydrocarbon odour. 1.72-1.82 m black and red sandy angular to subangular fine to medium gravel of brick, clinker and tar. Slight hydrocarbon odour.			
(MADE GROUND)			
3.50 m becoming less gravelly			
4.00 m becoming very soft	(4.35)		
5.50-5.60 m occasional black angular to subangular fine to coarse gravel of clinker/slag			
EXPLORATORY HOLE ENDS AT 6.00 m	6.00 *+85.19*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.34	Concrete core 200mm.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS239A

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.37m / 200mm 0.37m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 3.00m / 67mm	**Ground Level** +91.21 mOD **Coordinates** E 434720.20 **National Grid** N 406320.10 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.37-1.00	L 1			
0.50-0.70	ES 1A			
1.00-2.00	L 2			
1.40-1.60	ES 2A			
2.00-3.00	L 3			
2.90-3.00	ES 3A		04/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.37) 0.37 *+90.84*		
Firm dark brown mottled black slightly sandy very gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, mudstone, sandstone and clinker. Slight hydrocarbon odour. (MADE GROUND)	(1.63)		
No Recovery.	2.00 *+89.21* (0.80)		
Very weak grey locally orange and black MUDSTONE recovered as sandy angular fine to medium gravel. Slight hydrocarbon and sewage odour. (MADE GROUND)	2.80 *+88.41* 3.00 *+88.21*		
EXPLORATORY HOLE ENDS AT 3.00 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.37	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.32m – 200mm 0.32m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm	**Ground Level** +91.19 mOD **Coordinates** E 434715.00 **National Grid** N 406310.80 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.32-1.00	L 1			
0.50-0.70	ES 1A			
1.00-2.00	L 2			
1.30-1.60	ES 2A			
2.00-3.00	L 3			
2.90-3.00	ES 3A		04/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.32)		
(MADE GROUND)	0.32 *+90.87*		
Firm light brown mottled orange and black sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, metal, limestone and mudstone.	(0.83)		
(MADE GROUND)	1.15 *+90.04*		
Very weak thinly laminated grey locally dark grey MUDSTONE locally grading into clay. Slight hydrocarbon odour.	(1.85)		
2.00-2.42 m locally recovered as angular to subangular fine to medium gravel			
2.70 m strong hydrocarbon odour			
EXPLORATORY HOLE ENDS AT 3.00 m	3.00 *+88.19*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.32	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS241

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 05/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.80m – 200mm 0.80m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 5.00m – 57mm	**Ground Level** +91.20 mOD **Coordinates** E 434730.00 **National Grid** N 406314.20 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.80-1.00	L 1			
0.80-0.90	ES 1A			
1.00-2.00	L 2			
1.60-1.80	ES 2A			
2.00-3.00	L 3			
2.80-2.90	ES 3A			
3.00-4.00	L 4			
4.00-5.00	L 5			
4.80	ES 4A		05/03/2008	dry
5.00	ES 5A			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.80)		
Brown slightly gravelly SAND with low cobble content. Gravel is angular to subangular fine to coarse of concrete. Cobbles are angular of concrete. (MADE GROUND)	0.80 *+90.40* 1.00 *+90.20*		
Firm dark brown and light brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including concrete, sandstone, brick and clinker. (MADE GROUND)	(2.00)		
No Recovery. 3.00 m locally red	3.00 *+88.20* (0.50)		
Firm dark brown and light brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including concrete, sandstone, brick and clinker. (MADE GROUND)	3.50 *+87.70* (0.50) 4.00 *+87.20*		
No Recovery.	(0.50) 4.50 *+86.70*		
Brown and black slightly sandy GRAVEL. Gravel is angular to subrounded fine to coarse of various lithologies including quartzite, clinker, sandstone and coal. Slight sewage odour. (MADE GROUND)	4.73 *+86.47* 4.94 *+86.26*		
Stiff black and dark grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine of mudstone.			
Very weak thinly laminated grey MUDSTONE.			
EXPLORATORY HOLE ENDS AT 5.00 m	5.00 *+86.20*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.80	Concrete core 200mm.
5.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS242

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.35m – 200mm 0.35m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm	**Ground Level** +91.20 mOD **Coordinates** E 434724.20 **National Grid** N 406305.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.35-1.00	L 1			
0.80-1.00	ES 1A			
1.00-2.00	L 2			
1.50-1.90	ES 2A			
2.00-3.00	L 3			
			04/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.35)		
(MADE GROUND)	0.35 *+90.85*		
Firm to stiff brown locally red mottled black sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including mudstone, sandstone, brick, clinker and slag. (MADE GROUND)	(2.65)		
0.60-0.74 m sandy angular fine to coarse gravel of sandstone			
1.60-1.70 m sandy angular fine to coarse gravel of brick and concrete			
2.80-2.95 m sandy angular fine to coarse gravel of brick			
EXPLORATORY HOLE ENDS AT 3.00 m	3.00 *+88.20*		
2.95-3.00 m sandy angular fine to coarse gravel of sandstone			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS243

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 05/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.38m – 200mm 0.38m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 4.50m – 57mm	**Ground Level** +91.18 mOD **Coordinates** E 434724.60 **National Grid** N 406307.00 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.38-1.00	L 1			
1.00-2.00	L 2			
1.60-1.80	ES 1A			
2.00-3.00	L 3			
3.00-4.00	L 4			
3.70-4.00	ES 2A			
4.00-4.45	L 5			
4.30-4.50	ES 3A		05/03/2008	dry
4.50	ES 4A			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.38) 0.38 *+90.80*		
Soft grey mottled brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including concrete, mudstone, brick and sandstone. (MADE GROUND) 0.90-1.40 m brown slightly clayey gravelly sand. Gravel is angular to subrounded fine to medium of various lithologies including brick, concrete and sandstone	(1.62)		
No Recovery. 2.00-2.70 m No Recovery	2.00 *+89.18* (0.70)		
Soft grey mottled brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including concrete, mudstone, brick and sandstone. (MADE GROUND) 2.70-2.80 m dark brown slightly clayey slightly gravelly fine sand. Gravel is angular to subangular fine to medium of concrete, slag and brick	2.70 *+88.48* (0.30) 3.00 *+88.18*		
Brown, grey to black slightly clayey slightly sandy GRAVEL. Gravel is subangular to rounded fine to coarse of various lithologies including sandstone and quartzite. Strong hydrocarbon and sewage odour. (MADE GROUND)	(0.60) 3.60 *+87.58* (0.40) 4.00 *+87.18* (0.50)		
Firm black slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of various lithologies including slag and clinker. Strong hydrocarbon/sewage odour. (MADE GROUND)	4.50 *+86.68*		
Black slightly clayey sandy GRAVEL. Gravel is subangular to subrounded fine to medium of various lithologies including sandstone, quartzite, clinker and slag. Strong hydrocarbon/sewage odour. (MADE GROUND)			
EXPLORATORY HOLE ENDS AT 4.50 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.38	Concrete core 200mm.
4.50		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS243A

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 04/03/2008 **End** 04/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.32m / 200mm 0.32m / 1.00m / 87mm	**Ground Level** +91.19 mOD **Coordinates** E 434730.40 **National Grid** N 406307.60 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.32-1.00	L 1			
0.50-0.70	ES 1A			
			04/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.32)		
(MADE GROUND)	0.32 *+90.87*		
Firm black and brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including concrete, sandstone and brick.	(0.48)		
(MADE GROUND)	0.80 *+90.39*		
Dark brown and black slightly gravelly SAND. Gravel is angular to subangular fine of various lithologies including concrete, sandstone and brick.	1.00 *+90.19*		
(MADE GROUND)			
EXPLORATORY HOLE ENDS AT 1.00 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.32	Concrete core 200mm.
1.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS244

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 05/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.40m – 200mm 0.40m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 4.00m – 57mm	**Ground Level** +91.20 mOD **Coordinates** E 434721.10 **National Grid** N 406316.30 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00	L 1			
0.70-0.80	ES 1A			
1.00-2.00	L 2			
1.60-1.80	ES 2A			
2.00-3.00	L 3			
2.50-2.70	ES 3A			
3.00-4.00	L 4			
3.50-4.00	ES 4A			
			05/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.40)		
(MADE GROUND)	0.40 *+90.80*		
Soft to firm brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including sandstone, brick, mudstone, coal and slag. (MADE GROUND) — 0.40-0.50 m very sandy gravel	(0.60)		
No Recovery.	1.00 *+90.20*		
	(0.46)		
	1.46 *+89.74*		
Soft to firm brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including sandstone, brick, mudstone, coal and slag. (MADE GROUND)	1.60 *+89.60*		
Brown mottled black slightly clayey gravelly SAND. Gravel is subangular to subrounded fine to medium of various lithologies including brick and mudstone. (MADE GROUND) — 2.25-2.70 m becoming clayey	(1.10)		
	2.70 *+88.50*		
Soft to firm grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of mudstone. Slight hydrocarbon odour. — ~~2.90-3.00 m~~ angular gravel of mudstone	(0.84)		
	3.54 *+87.66*		
Very weak thinly laminated grey MUDSTONE. Strong hydrocarbon odour.	(0.46)		
EXPLORATORY HOLE ENDS AT 4.00 m	4.00 *+87.20*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.40	Concrete core 200mm.
4.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS245

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 06/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.30m / 200mm 0.30m / 1.00m / 87mm	**Ground Level** +91.19 mOD **Coordinates** E 434696.10 **National Grid** N 406336.70 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
0.60-0.80	ES 1A		06/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.30)		
(MADE GROUND)	0.30 *+90.89*		
Soft to firm grey and brown mottled back sandy gravelly CLAY. Gravel is angular to subrounded of brick, coal and sandstone. Slight hydrocarbon odour. 0.60 m low cobble content, cobbles are angular to subrounded of brick	(0.60)		
(MADE GROUND)	0.90 *+90.29*		
No Recovery. 0.90 m abundant angular gravel of coal	1.00 *+90.19*		
EXPLORATORY HOLE ENDS AT 1.00 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
1.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS246

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 13/03/2008 **End** 13/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Ground Level** - **Coordinates** - **National Grid** - **Chainage**

Depth from	to	Diameter	Casing Depth
0.00m	0.60m	200mm	
0.60m	1.00m	87mm	
1.00m	2.20m	77mm	
2.20m	2.60m	67mm	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.60-1.60	L 1			
0.80-1.00	ES 1A			
1.60-2.20	L 2			
2.00-2.20	ES 2A			
2.20-2.60	L 3			
			13/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Concrete. (MADE GROUND) (Foreman's description)	0.10 (0.30) 0.40		
Backfill. (MADE GROUND) (Foreman's description)	0.55 0.80		
Concrete. (MADE GROUND) (Foreman's description)			
Light grey and cream slightly silty slightly sandy angular fine to coarse GRAVEL of limestone. (MADE GROUND) 1.90-2.20 m dark grey and brown	(1.80)		
Dark orange and brown slightly silty gravelly fine to coarse SAND. Gravel is subangular fine to coarse of sandstone. (MADE GROUND)	2.60		
EXPLORATORY HOLE ENDS AT 2.60 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.60	Hand excavated inspection pit using pneumatic breaker.
2.60		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS247

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 06/03/2008 **End** 06/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.70m / 200mm 0.70m / 1.00m / 87mm 1.00m / 1.80m / 77mm	**Ground Level** +95.24 mOD **Coordinates** E 434687.00 **National Grid** N 406387.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.70-1.00 0.70-0.80	L 1 ES 1A			
1.00-1.80	L 2			
1.30-1.40	ES 2A			
			06/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam. (Foreman's description) (MADE GROUND)	0.08 *+95.16* (0.62)		
CONCRETE. (Foreman's description) (MADE GROUND)	0.70 *+94.54*		
Pale yellow locally brown and yellow SAND and GRAVEL. Gravel is angular to subangular of limestone and brick. (MADE GROUND) 0.90 m coarse gravel size pocket of brown and grey sandy gravelly clay. Gravel is angular to subrounded of various lithologies including coal.	(0.90) 1.60 *+93.64*		
Brown and red mottled black and white slightly sandy GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of brick and tarmacadam. Cobbles are angular of brick.. (MADE GROUND) 0.95 m angular cobble of sandstone 1.00-1.10 m No Recovery 1.30 m becoming slightly clayey	1.80 *+93.44*		
EXPLORATORY HOLE ENDS AT 1.80 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
1.80		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project	**BARNSLEY MARKETS PHASE 2**
Project No.	**A8017**
Carried out for	**1249 Regeneration Partnership LLP**

Borehole

WS248

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 05/03/2008 **End** 05/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** **to** **Diameter** **Casing Depth** 0.00m 0.50m 200mm	**Ground Level** +91.09 mOD **Coordinates** E 434670.20 **National Grid** N 406334.20 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
			05/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.50)		
	0.50 *+90.59*		
EXPLORATORY HOLE ENDS AT 0.50 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.50	Concrete core 200mm..
0.50		Hole terminated due to nature of concrete. (Wardell Armstrong).

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS249

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Dando tTerrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.32m / 200mm 0.32m / 1.00m / 87mm 1.00m / 1.56m / 77mm	**Ground Level** +91.24 mOD **Coordinates** E 434678.00 **National Grid** N 406323.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.32-1.00	L 1			
0.50	ES 1A			
0.80	ES 2A			
1.00-1.56	L 2			
1.50	ES 3		07/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.32) 0.32 *+90.92*		
Stiff light brown to dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. 0.50-0.60 m grading to carbonaceous mudstone	0.50 *+90.74*		
Very weak dull black COAL.	(0.63) 1.13 *+90.11*		
Brown and grey sandy GRAVEL. Gravel is angular fine to medium of mudstone.	1.30 *+89.94*		
Thinly laminated grey and brown MUDSTONE. Recovered as sandy angular fine to medium gravel.	(0.26) 1.56 *+89.68*		
EXPLORATORY HOLE ENDS AT 1.56 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.32	Concrete core 200mm.
1.56		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Borehole

WS250

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.26m – 200mm 0.26m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm	**Ground Level** +91.88 mOD **Coordinates** E 434634.40 **National Grid** N 406295.10 **Chainage**	

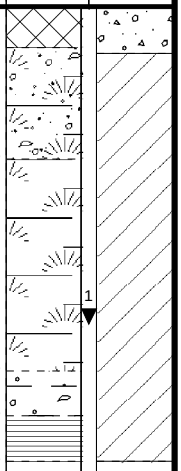
Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.26-1.00	L 1			
0.40	ES 1A			
0.80	ES 2A			
1.00-2.00	L 2			
2.00-3.00	L 3			
2.50	ES 3A		07/03/2008	

Strata

Description	Depth, *Level* (Thickness)
CONCRETE. (MADE GROUND)	(0.26) 0.26 *+91.62*
Stiff light brown to dark brown mottled black slightly sandy slightly gravelly organic CLAY. Gravel is angular to subangular fine to coarse of mudstone, sandstone and coal.	(0.74) 1.00 *+90.88*
Stiff thinly laminated black and grey slightly gravelly organic CLAY. Gravel is angular to subangular fine to medium of mudstone, sandstone and coal.	(1.40)
2.30 m becoming slightly sandy Stiff thinly laminated grey mottled orange and brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of mudstone.	2.40 *+89.48* (0.30) 2.70 *+89.18*
Very weak thinly laminated grey MUDSTONE.	(0.30) 3.00 *+88.88*
EXPLORATORY HOLE ENDS AT 3.00 m	

Legend / Backfill/ Instruments



Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	2.00	-	-

Depth Related Remarks *

From	to (m)	
0.00	0.26	Concrete core 200mm.
3.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS251

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled AN **Logged** KW **Checked** JT	**Start** 07/03/2008 **End** 07/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.35m / 200mm 0.35m / 1.00m / 87mm 1.00m / 1.70m / 77mm	**Ground Level** +91.21 mOD **Coordinates** E 434726.80 **National Grid** N 406298.90 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.35-1.00	L 1			
0.80	ES 1A			
1.00-1.70	L 2			
1.50	ES 2A		07/03/2008	dry
1.70	ES 3			

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.35) 0.35 *+90.86*		
Stiff to very stiff grey mottled black locally orange and brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone, brick and mudstone. Slight hydrocarbon odour. 0.45 m cobble of tar 0.50-0.56 m very sandy very gravelly 1.20-1.29 m very sandy very gravelly (MADE GROUND)	(0.95) 1.30 *+89.91*		
Orange and brown very sandy GRAVEL. Gravel is subrounded to rounded fine to coarse of sandstone. 1.47-1.50 m tar with strong hydrocarbon odour (MADE GROUND)	1.47 *+89.74*		
Very weak thinly laminated dark grey locally brown and orange MUDSTONE. Recovered as slightly sandy angular to subangular fine to medium gravel.	1.70 *+89.51*		
EXPLORATORY HOLE ENDS AT 1.70 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.35	Concrete core 200mm.
1.70		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS252

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from / to / Diameter / Casing Depth** 0.00m / 0.30m / 200mm 0.30m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 2.60m / 67mm	**Ground Level** +91.18 mOD **Coordinates** E 434709.40 **National Grid** N 406325.30 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
1.00-2.00	L 2			
1.50-1.80	ES 1A			
2.00-2.60	L 3			
2.40-2.50	ES 2A		12/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)
CONCRETE.	(0.30)
(MADE GROUND)	0.30 *+90.88*
Brown slightly clayey gravelly SAND. Gravel is angular to subangular fine to medium of various lithologies including brick, sandstone, mudstone and limestone. (MADE GROUND)	(1.98)
0.90-1.00 m occasional coarse to medium gravel size pockets of sandy gravelly clay. Gravel is angular to subangular fine of various lithologies including brick, mudstone and sandstone	
Very weak thinly laminated grey locally mottled orange and brown MUDSTONE.	2.28 *+88.90* (0.32) 2.60 *+88.58*
EXPLORATORY HOLE ENDS AT 2.60 m	

Legend

Backfill/ Instruments

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
2.60		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS253

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from to Diameter Casing Depth** 0.00m 0.30m 200mm 0.30m 1.00m 87mm	**Ground Level** +91.20 mOD **Coordinates** E 434706.50 **National Grid** N 406294.20 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
0.50-0.80	ES 1A			
			12/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.30)		
(MADE GROUND)	0.30 *+90.90*		
No Recovery.	(0.30)		
Very weak thinly laminated grey locally orange and brown MUDSTONE. 0.60-0.82 m dusting of medium to coarse sand on laminated surfaces	0.60 *+90.60*		
	(0.40)		
EXPLORATORY HOLE ENDS AT 1.00 m	1.00 *+90.20*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
1.00		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS254

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.23m / 200mm 0.23m / 1.00m / 87mm 1.00m / 1.66m / 77mm	**Ground Level** +91.18 mOD **Coordinates** E 434703.10 **National Grid** N 406305.70 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.23-1.00	L 1			
0.50-0.60	ES 1A			
1.00-1.45	SPT S	N=45 (6,7/7,9,9,20)		
1.00-1.60	L 2			
1.40-1.50	ES 2A		12/03/2008	
1.60-1.60	SPT S	(25 for 2mm/50 for 0mm)		dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	0.23 *+90.95*		
(MADE GROUND)			
White slightly sandy angular fine to medium GRAVEL of limestone. (MADE GROUND)	0.40 *+90.78*		
	(0.60)		
Firm brown and grey locally orange and brown mottled black slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including mudstone and sandstone. 0.85 m becoming dark brown 0.95 m coarse angular to subrounded gravel of ironstone	1.00 *+90.18*		
	(0.66)		
Very weak thinly laminated locally orange, brown and black MUDSTONE.	1.66 *+89.52*		
EXPLORATORY HOLE ENDS AT 1.66 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.23	Concrete core 200mm.
1.66		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS255

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.30m / 200mm 0.30m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 2.52m / 67mm	**Ground Level** +91.37 mOD **Coordinates** E 434628.60 **National Grid** N 406367.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
0.80	ES 1A			
1.00-1.45	SPT S	N=26 (4,6/6,6,6,8)		
1.00-2.00	L 2			
2.00-2.45	SPT S	N=44 (7,8/8,8,10,18)		
2.00-2.52	L 3			
			12/03/2008	dry
2.50-2.50	SPT S	(25 for 2mm/50 for 0mm)		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.30)		
(MADE GROUND)	0.30 *+91.07*		
Pale brown gravelly SAND. Gravel is angular to subangular fine to coarse of various lithologies including limestone and sandstone. 0.70 m becoming clayey	(0.45)		
(MADE GROUND)	0.75 *+90.62*		
Very stiff dark brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including coal, mudstone and sandstone.	(1.05)		
	1.80 *+89.57*		
Very stiff grey and orange slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine of mudstone.	2.00 *+89.37*		
Very weak thinly laminated grey mottled orange and brown MUDSTONE. Recovered as slightly sandy slightly gravelly clay. Gravel is angular to subangular fine.	(0.52)		
EXPLORATORY HOLE ENDS AT 2.52 m	2.52 *+88.85*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
2.52		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS256

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 0.45m – 200mm – 1.00m 0.45m – 1.00m – 87mm – 2.00m 1.00m – 2.00m – 77mm – 2.60m 2.00m – 2.60m – 67mm	**Ground Level** +90.44 mOD **Coordinates** E 434613.50 **National Grid** N 406310.00 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.45-1.00	L 1			
0.60-0.70	ES 1			
1.00-1.45	SPT S	N=20 (4,4/4,5,5,6)		
1.00-2.00	L 2			
1.50-1.60	ES 2			
2.00-2.45	SPT S	N=52 (7,10/10,12,12,18)		
2.00-2.60	L 3			
2.20-2.30	ES 3			
			12/03/2008	dry
~~2.60-2.60~~	~~SPT S~~	~~50 (25 for 3mm/50 for 1mm)~~		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.			
(MADE GROUND)	(0.45)		
	0.45 *+89.99*		
Pale greyish white slightly clayey gravelly coarse SAND. Gravel is angular to subangular fine to medium of various lithologies including limestone. 0.50 m Plastic membrane.	0.50 *+89.94*		
(MADE GROUND)	0.60 *+89.84*		
	(0.40)		
Firm brown locally orangish yellow mottled black sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies including sandstone, coal and mudstone. 1.20-1.23 m Coarse sand. 1.80-1.90 m Very ~~clayey~~.	1.00 *+89.44*		
	(1.55)		
Brown to dark black brown slightly clayey very gravelly SAND. Gravel is angular to subrounded fine to coarse of various lithologies including coal, sandstone and mudstone. 1.90 m Angular cobble of sandstone.	2.55 *+87.89*		
	2.60 *+87.84*		
Stiff to very stiff brownish grey locally orange sandy slightly gravelly CLAY/SILT. Gravel is angular to subrounded fine to coarse of medium of sandstone and carbonaceous mudstone.			
Very stiff pale brownish grey CLAY/SILT.			
EXPLORATORY HOLE ENDS AT 2.60 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.45	Concrete core 200mm.
2.60		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

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Borehole

WS257

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** 0.00m **to** 1.40m **Diameter** 87mm **Casing Depth**	**Ground Level** +96.40 mOD **Coordinates** E 434577.20 **National Grid** N 406357.40 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.25-1.40	L 1		12/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)
CONCRETE. (MADE GROUND)	0.25 *+96.15*
Brown locally white slightly clayey GRAVEL. Gravel is angular to subangular fine to coarse of sandstone and concrete. 0.45 m subrounded cobble of sandstone. (MADE GROUND)	(1.15)
EXPLORATORY HOLE ENDS AT 1.40 m	1.40 *+95.00*

Legend

Backfill/ Instruments

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.25	Concrete core 200mm.
1.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

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Project No. A8017

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Borehole

WS258A

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** KW **Checked** JT	**Start** 12/03/2008 **End** 12/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 0.30m / 200mm 0.30m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 2.20m / 67mm	**Ground Level** +96.39 mOD **Coordinates** E 434576.30 **National Grid** N 406352.90 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.30-1.00	L 1			
0.50-0.70	ES 1			
1.00-1.45	SPT S	N=37 (4,8/8,9,10,10)		dry
1.00-2.00	L 2			
1.50-1.60	ES 2			
2.00-2.20	SPT S	50 (4,6/50 for 50mm)	12/03/2008	
2.00-2.20	ES 3			dry
2.00-2.20	L 3			
2.20	SPT S	(25 for 0mm/50 for 0mm)		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.	(0.30)		
(MADE GROUND)	0.30 *+96.09*		
Pale brown very gravelly SAND. Gravel is angular to subrounded fine to coarse of various lithologies including concrete and sandstone. 0.68 m Angular to subangular cobble of sandstone. 0.90-1.00 m Angular cobble of sandstone.	(0.37)		
(MADE GROUND)	0.67 *+95.72*		
Dense black brown mottled cream gravelly SAND. Gravel is angular to subangular fine to coarse of various lithologies including brick, tar and limestone. Slight hydrocarbon odour. 1.70-1.80 m Slightly clayey.	(1.13)		
(MADE GROUND)	1.80 *+94.59*		
Orangish brown slightly gravelly coarse SAND. Gravel is angular to subrounded fine to coarse of sandstone.	2.00 *+94.39*		
(MADE GROUND)	2.20 *+94.19*		
Dense to very dense pale greyish brown gravelly SAND. Gravel is angular to subrounded fine to medium of various lithologies including limestone and tar. Slight hydrocarbon odour.			
(MADE GROUND)			
EXPLORATORY HOLE ENDS AT 2.20 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 200mm.
2.20		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

WS258

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 14/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.40m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 3.00m / 67mm 3.00m / 3.90m / 57mm	**Ground Level** +97.24 mOD **Coordinates** E 434629.90 **National Grid** N 406251.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00 0.50-1.50	L 1 ES 1			
1.00-1.45 1.00-2.00	SPT S L 2	N=29 (2,4/7,7,7,8)		
2.00-0.00 2.00-3.00 2.00-3.00	SPT S ES 2 L 3	N=36 (4,8/8,8,9,11)		
3.00-3.45 3.00-3.90	SPT S L 4	N=17 (3,4/4,4,4,5)		
3.70-3.90	ES 3		14/03/2008	dry
~~3.90-3.90~~	~~SPT S~~	~~50 (25 for 1mm/50 for 1mm)~~		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE.			
(MADE GROUND)	0.25 *+96.99*		
Medium dense light grey pink slightly silty slightly sandy GRAVEL. Gravel is angular fine to coarse of sandstone and limestone. (MADE GROUND)	(1.55)		
	1.80 *+95.44*		
Firm to stiff dark brown mottled orange slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium of various lithologies including brick, coal and sandstone. (MADE GROUND)	2.00 *+95.24*		
Dense becoming medium dense light grey pink slightly silty slightly sandy GRAVEL. Gravel is angular fine to coarse of sandstone and limestone. (MADE GROUND)	(1.60)		
	3.60 *+93.64*		
Firm to stiff dark brown mottled orange slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium of various lithologies including brick, coal and sandstone. (MADE GROUND)	(0.30)		
	3.90 *+93.34*		
EXPLORATORY HOLE ENDS AT 3.90 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	0.25	Concrete core 150mm.
3.90		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 13/03/2008 **End** 13/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.20m / - 1.20m / 2.00m / 87mm 2.00m / 3.00m / 77mm 3.00m / 3.60m / 67mm	**Ground Level** +96.80 mOD **Coordinates** E 434688.50 **National Grid** N 406359.40 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.00-1.45 1.00-2.00	SPT S L 1	N=28 (4,4/4,6,9,9)		
1.80-2.00	ES 1A			
2.00-2.45 2.00-3.00	SPT S L 2	N=28 (6,7/7,7,7,7)		
2.70-2.90	ES 2A			
3.00-3.45 3.00-3.60	SPT S L 3	N=33 (4,8/7,8,8,10)		
3.40-3.60	ES 3A		13/03/2008	dry
3.60	SPT S	(25 for 0mm/50 for 0mm)		

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam. (MADE GROUND) (Foreman's description)	0.10 *+96.70* (0.50)		
Hardcore. (MADE GROUND) (Foreman's description)	0.60 *+96.20* 0.80 *+96.00*		
CONCRETE. (MADE GROUND)	(0.45) 1.25 *+95.55*		
Light grey and cream slightly silty slightly sandy GRAVEL. Gravel is angular fine to coarse of limestone. (MADE GROUND)			
Medium dense becoming dense dark orange and brown slightly gravelly SAND. Gravel is subangular fine to coarse of sandstone. (MADE GROUND) 2.00-3.60 m locally mottled black	(2.35)		
EXPLORATORY HOLE ENDS AT 3.60 m	3.60 *+93.20*		

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
3.60		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 13/03/2008 **End** 13/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 2.00m – 87mm 2.00m – 3.00m – 77mm 3.00m – 4.00m – 67mm 4.00m – 4.40m – 57mm	**Ground Level** +96.52 mOD **Coordinates** E 434706.80 **National Grid** N 406361.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.00-2.00	L 1			
1.20-1.40	ES 1A			
2.00-3.00	L 2			
2.00-4.00	ES 2A			
3.00-4.00	L 3			
4.00-4.40	ES 3A			
4.00-4.40	L 4		13/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam. (MADE GROUND) (Foreman's description)	0.15 *+96.37* 0.35 *+96.17*		
Hardcore. (MADE GROUND) (Foreman's description)			
Dark grey and brown slightly silty gravelly SAND. Gravel is angular to subangular fine to coarse of sandstone and mudstone. (MADE GROUND) 2.40-2.60 m very gravelly 3.30-3.60 m very gravelly	(3.65)		
Firm to stiff dark grey mottled black slightly sandy gravelly CLAY. Gravel is angular to subangular fine to medium of various lithologies including coal, brick and mudstone. (MADE GROUND)	4.00 *+92.52* 4.20 *+92.32*		
Dark orange and brown mottled black slightly silty slightly sandy GRAVEL. Gravel is angular fine to medium of shale and coal. (MADE GROUND)	4.40 *+92.12*		
EXPLORATORY HOLE ENDS AT 4.40 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
0.00	1.00	Hand excavated inspection pit using pneumatic breaker.
0.35	1.00	No sample recovered.
4.40		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Project No. A8017

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Borehole

WS261

Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 13/03/2008 **End** 13/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 1.00m / 87mm 1.00m / 2.00m / 77mm 2.00m / 2.60m / 67mm	**Ground Level** +95.05 mOD **Coordinates** E 434712.90 **National Grid** N 406375.00 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.00-2.00	L 1			
1.30-1.40	ES 1A			
2.00-2.60	L 2			
2.40-2.50	ES 2A		13/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND) (Foreman's description)	(0.40) 0.40 *+94.65*		
Hardcore. (MADE GROUND) (Foreman's description)	0.60 *+94.45*		
Light orange and grey silty slightly gravelly SAND. Gravel is subangular fine to coarse of sandstone and brick. (MADE GROUND)	(1.80)		
Light yellow angular fine to coarse GRAVEL of brick. (MADE GROUND)	2.40 *+92.65* 2.60 *+92.45*		
EXPLORATORY HOLE ENDS AT 2.60 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand excavated inspection pit using pneumatic breaker.
0.60	1.00	No sample recovery.
2.60		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 14/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 1.00m / 2.00m / 87mm 2.00m / 3.00m / 77mm 3.00m / 3.90m / 67mm	**Ground Level** +92.33 mOD **Coordinates** E 434731.40 **National Grid** N 406369.50 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
1.00-2.00	L 1			
1.50-1.60	ES 1			
2.00-3.00	L 2			
2.80-3.20	ES 2			
3.00-3.90	L 3			
			14/03/2008	dry

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Tarmacadam. (Foreman's Description)	0.20 *+92.13*		
Hardcore. (Foreman's Description)	(0.50)		
Firm to stiff dark grey mottled black slightly sandy gravelly CLAY. Gravel is subangular fine to coarse of various lithologies including brick, coal and mudstone. (MADE GROUND)	0.70 *+91.63*		
	(1.80)		
Dark orange brown slightly silty gravelly SAND. Gravel is angular to subangular fine to coarse of sandstone and quartz. (MADE GROUND)	2.50 *+89.83*		
	(1.40)		
EXPLORATORY HOLE ENDS AT 3.90 m	3.90 *+88.43*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.00	1.20	Hand dug inspection pit using pneumatic breaker.
3.90		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

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Sheet 1 of 1

Window Sampler Hole Log

Soil Mechanics

Drilled CB **Logged** BS **Checked** JT	**Start** 14/03/2008 **End** 14/03/2008	**Equipment, Methods and Remarks** Dando terrier 2002 Windowless sampling	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m – 1.00m – 87mm 1.00m – 2.00m – 77mm 2.00m – 3.00m – 67mm 3.00m – 3.20m – 57mm	**Ground Level** +91.19 mOD **Coordinates** E 434733.40 **National Grid** N 406309.90 **Chainage**

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.40-1.00	L 1			
0.70-0.90	ES 1			
1.00-2.00	L 2			
1.50-1.60	ES 2			
2.00-3.00	ES 3			
2.00-3.00	L 3			
3.00-3.20	L 4		14/03/2008	

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
CONCRETE. (MADE GROUND)	(0.30) 0.30 *+90.89*		
Dark grey black silty gravelly SAND. Gravel is subangular to subrounded fine to coarse of various lithologies including coal, sandstone, and brick. (MADE GROUND)	(1.50)		
1.50-1.80 m Black slight hydrocarbon odour.	1.80 *+89.39*		
Soft to firm to dark grey mottled black slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of various lithologies including brick, sandstone and coal. (MADE GROUND)	2.00 *+89.19* (1.20)		
Dark grey black silty gravelly SAND. Gravel is subangular to subrounded fine to coarse of various lithologies including coal, sandstone, and brick. (MADE GROUND)	3.20 *+87.99*		1
EXPLORATORY HOLE ENDS AT 3.20 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.20	-	-

Depth Related Remarks *

From	to (m)	
0.00	0.30	Concrete core 150mm.
3.20		Hole terminated due to refusal.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

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Borehole

WS264

Sheet 1 of 1

ENCLOSURE B
INSTRUMENTATION

Installation Details B1

Installation Details

Soil Mechanics

Hole No	Instrument ID	Installation Type	Date of Installation	Reference depth (mBGL)	Piezometer Diameter (mm)	Top of response zone (mBGL)	Base of response zone (mBGL)	Tubing Completion Details	Headworks	Remarks
BH202		SP	14 Mar 2008	0.00	50	15.00	20.00	Gas tap	Stop cock cover	
BH207	A	SP	26 Mar 2008	0.00	50	3.00	5.00	Open	Stop cock cover	
BH207	B	SP	26 Mar 2008	0.00	50	15.00	20.00	Gas tap	Stop cock cover	
BH208	A	SP	30 Mar 2008	0.00	50	12.60	17.60	Gas tap	Stop cock cover	
BH208	B	SP	30 Mar 2008	0.00	50	2.50	4.50	Open	Stop cock cover	
BH210		SP	4 Apr 2008	0.00	50	15.00	20.00	Gas tap	Stop cock cover	
BH211		SP	2 Apr 2008	0.00	50	2.50	5.00	Gas tap	Stop cock cover	
BH212		SP	27 Mar 2008	0.00	50	1.00	6.50	Gas tap	Stop cock cover	
BH213A	B	SP	7 Apr 2008	0.00	50	10.00	15.00	Gas tap	Stop cock cover	
BH213A	A	SP	7 Apr 2008	0.00	19	2.00	4.00	Open	Stop cock cover	
BH214	B	SP	2 Apr 2008	0.00	50	10.00	15.00	Gas tap	Stop cock cover	
BH214	A	SP	2 Apr 2008	0.00	19	3.00	4.00	Open	Stop cock cover	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Electronic Piezometer Prepared: 19/05/2008 09:56

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Project BARNSLEY MARKETS PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

Table B1

ENCLOSURE C

IN SITU TESTING

Notes on Pressuremeter Test Results	Key
Pressuremeter Calibration Register	HPD No 940715
Summary of Pressuremeter Test Results	Table 1
High Pressure Dilatometer Results	
A Brief Description of the Cambridge High Pressure Dilatometer and the Interpretation of Tests in Rock	

Notes on Pressuremeter Test Results

KEY TO HPD RESULTS

P_o	Pressure corresponding to regeneration of in situ strain.
c_u	Undrained shear strength.
p_L	Limit pressure.
G_i	Initial shear modulus.
G_{ur}	Shear modulus derived from unload-reload loop.
ε_c	Cavity Strain range over which loop has been performed.

NOTES ON RESULTS

1. Summary results are presented for the high pressure dilatometer (HPD) tests carried out at this site. Full details of the tests and analysis are presented in Enclosure B. Where appropriate, the summary results presented here are based on a graphical average of all three strain axes of the HPD. Use of average readings for strain arms reduces the influence of movement of the pressuremeter relative to the test pocket and may therefore be considered to be a more reliable result. Reference should be made to graphical data and test notes to assess the reliability of individual results.

2. The soil type quoted is the presumed geological horizon. Reference should be made to borehole records for a full description.

3. The depth quoted for the test is the depth of the centre of the expanding section of the pressuremeter, corresponding to the location of the strain arms.

4. In cohesive soils the in situ total horizontal stress ($ó_{ho}$) is usually assessed using either the 'lift-off' method or the modified Marsland and Randolph method. However the former is not applicable to the HPD test due to the prebored nature of the test pocket and the latter can only be applied where the rock strength allows some yielding of the material within the pressure capacity of the instrument. As a result an accurate assessment of horizontal stress may not be reliably made. Instead an assessment has been made of the pressure at which the in situ strain of the cavity wall has been recreated ie: the strain position the cavity wall was at prior to any stress relief caused by the coring the test pocket. This pressure has been determined to correspond to the beginning of the linear (elastic) section of the loading curve and has been denoted as P_0 on the individual test results and main summary.

5. A pressuremeter test fails the soil in shear and all moduli quoted are shear moduli. Unload-reload loops are performed in tests to provide an estimate of unload-reload shear modulus (G_{ur}). G_{ur} values are usually used in design in preference to G_i. The actual value of G_{ur} is dependant on stress level and cavity strain range and the value given should be normalised as appropriate. A selection of relevant references are given in the accompanying description of the High Pressure Dilatometer and analyses used.
   It is normal practice to carry out two or more unload-reload loops during a test. Results from these individual loops are presented consecutively (ie G_{ur} for loop 1 is presented above G_{ur} for loop 2). The cavity strain range (ε_c) over which the loop has been performed is presented alongside the relevant G_{ur} value.

Notes on Pressuremeter Test Results

Estimation of elastic modulus (E) requires a value of Poisson's Ratio (ν) to be assumed. Elastic and shear modulus are related by:

$$E = 2G(1+ \nu)$$

Shear moduli are calculated in this way from the quasi-elastic loading phase of the test and from the unload reload loop data. Quoted shear moduli are rounded, to reflect the true accuracy of their measurement, in accordance with the following table:

G MPa	Round to nearest MPa
<20	1
20 to 50	2
50 to 100	5
100 to 200	10
200 to 500	20
500 to 1000	50
1000 to 3000	100

Due to the finite stiffness of the equipment and the potential in accuracies associated with the methods used to assess the compression of the instrument membrane it is not possible to accurately measure shear moduli in excess of about 3000 MN/m^2 and in such circumstances values are reported simply as greater than 3000 MN/m^2.

6. Tests terminated by membrane rupture before the full testing cycle could be completed have been identified as such on the individual test summary.

Pressuremeter Calibration Register

Instrument :	Digital High Pressure Dilatometer	Serial No.	940715

	Arm calibrations (mV / mm)						Pressure cell calibrations (mV / MPa)			
Date	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6	TPC A	TPC B		Cable (m)
18-Jan-07	221.4	214.7	223.8	217.8	214.4	195.8	53.7	56.6		
20-Feb-07	220.1	214.0	221.9	216.9	214.2	195.7				
20-Jun-07							58.1	61.2		
16-Nov-07	239.9	235.4	242.3	236.2	234.0	215.1	57.9			
15-Jan-08	238.0	234.6	241.4	235.0	231.5	211.1				
21-Jan-08							53.5			
Average	**230**	**225**	**232**	**226**	**224**	**204**	**57**	**61**		

	Calculated arm zeroes (mV)						Calculated pressure cell zeroes (mV)			
18-Jan-07	-908.6	-696.5	-1499.9	-1016.4	-796.5	-1117.1	-25.0	-687.9		
20-Feb-07	-960.6	-661.9	-1431.5	-1084.8	-744.8	-1164.7				
20-Jun-07							-16.5	-732.3		
16-Nov-07	-1129.9	-784.1	-1691.0	-1298.5	-774.8	-1249.5	-25.0			
15-Jan-08	-838.8	-670.0	-1564.8	-1230.7	-740.3	-1170.8	0.0			
21-Jan-08										
Average	**-959**	**-703**	**-1547**	**-1158**	**-764**	**-1176**	**-17**	**-710**		

Notes:
Nominal membrane stiffness correction:
slope = 18 kPa / mm
offset = 24 kPa

Project Kingsnorth Units 5 & 6 Phase 1 Ground Investigation

Project No. M7036

Carried out for

Table
PMT CAL

Summary of Pressuremeter Test Results

SM Geocone

Borehole reference	Test reference	Depth (m)	Test type	Date	Material type	Groundwater level for analysis (mbgl)	In situ horizontal stress, P_o (kPa)	Limit pressure, p_L (kPa)	Undrained shear strength, c_u (kPa)	Initial modulus G_i (MPa)	Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, e_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)	Remarks
201	1	6.40	HPD	11-Mar-08	Mudstone	1.21	422	2194	373	21	1	150	0.03	0.784	21	
											2	130	0.05	0.756	19	
201	2	10.20	HPD	12-Mar-08	Mudstone	1.21	640	11124	3217	32	1	240	0.05	0.780	40	
											2	200	0.11	0.849	72	
											3	240	0.07	0.803	47	
201	3	14.20	HPD	12-Mar-08	Mudstone	1.21	1500	21000	4799	145	1	340	0.21	0.760	73	
											2	400	0.22	0.732	74	
202	1	4.75	HPD	07-Mar-08	Mudstone	1.21	486	5701	1332	21	1	140	0.08	0.818	38	
											2	150	0.11	0.788	32	
202	2	10.60	HPD	07-Mar-08	Mst/sst	1.21	1552	41074	10616	137	1	800	0.04	0.794	141	
											2	700	0.07	0.955	515	
202	3	12.20	HPD	11-Mar-08	Mst/slts	1.21	1198	28906	6025	303	1	1600	0.03	0.442	13	
											2	1700	0.03	0.565	38	
203	1	6.90	HPD	27-Mar-08	Mudstone	1.21	657	6231	1488	42	1	150	0.07	0.768	26	
											2	160	0.09	0.656	12	
205	1	4.22	HPD	05-Mar-08	Mudstone	Test pocket disturbed. Data unsuitable for analysis.										
205	2	10.20	HPD	06-Mar-08	Mudstone	1.21	2287	38210	4692	850	1	>3000	0.02	1.265	38952	
											2	>3000	0.02	1.121	9376	

Notes:	Project	BARNSLEY MARKET PHASE 2	Table
	Project No.	A8017	1
	Carried out for	1249 Regeneration Partnership LLP	

Summary of Pressuremeter Test Results

SM Geocone

Borehole reference	Test reference	Depth (m)	Test type	Date	Material type	Groundwater level for analysis (mbgl)	In situ horizontal stress, P_o (kPa)	Limit pressure, p_L (kPa)	Undrained shear strength, c_u (kPa)	Initial modulus G_i (MPa)	Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, e_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)	Remarks
207	1	8.20	HPD	18-Mar-08	Mudstone	1.21	2000	15000	2612	154						Membrane burst at 55 bar during initial loading. No unload-reload data for stiffness analysis. Probably insufficient yield for reliable assessment of strength.
207	2	10.50	HPD	18-Mar-08	Mudstone	1.21	1300	49000	9553	448	1	>3000	0.01	NA	NA	Reverse movement during unload-reload loop
											2	>3000	0.01	NA	NA	
207	3	14.00	HPD	19-Mar-08	Mst/slts	1.21	1085	7984	1430	68	1	300	0.04	0.818	66	
											2	320	0.04	0.829	74	
212	1	10.80	HPD	18-Mar-08	Mudstone	1.21	743	4814	1084	12	1	200	0.02	0.999	126	
											2	180	0.03	0.917	99	
											3	190	0.04	0.707	21	
212	2	14.30	HPD	19-Mar-08	Mudstone	1.21	1139	29000	7762	51	1	300	0.08	1.193	1234	
											2	480	0.10	1.005	463	
212	3	17.50	HPD	20-Mar-08	NA											Test pocket disturbed. Data unsuitable for analysis.
219	1	9.50	HPD	25-Mar-08	Mst/slts	1.21	1126	6797	1518	46	1	170	0.08	0.793	36	
											2	180	0.11	0.812	50	
219	2	12.85	HPD	26-Mar-08	Mst/slts	1.21	1145	9655	1866	75	1	440	0.03	0.675	27	
											2	300	0.07	0.649	20	
219	3	16.80	HPD	27-Mar-08	Mudstone	1.21	2987	137134	26304	532	1	>3000	Reverse movement during unload-reload loop			

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

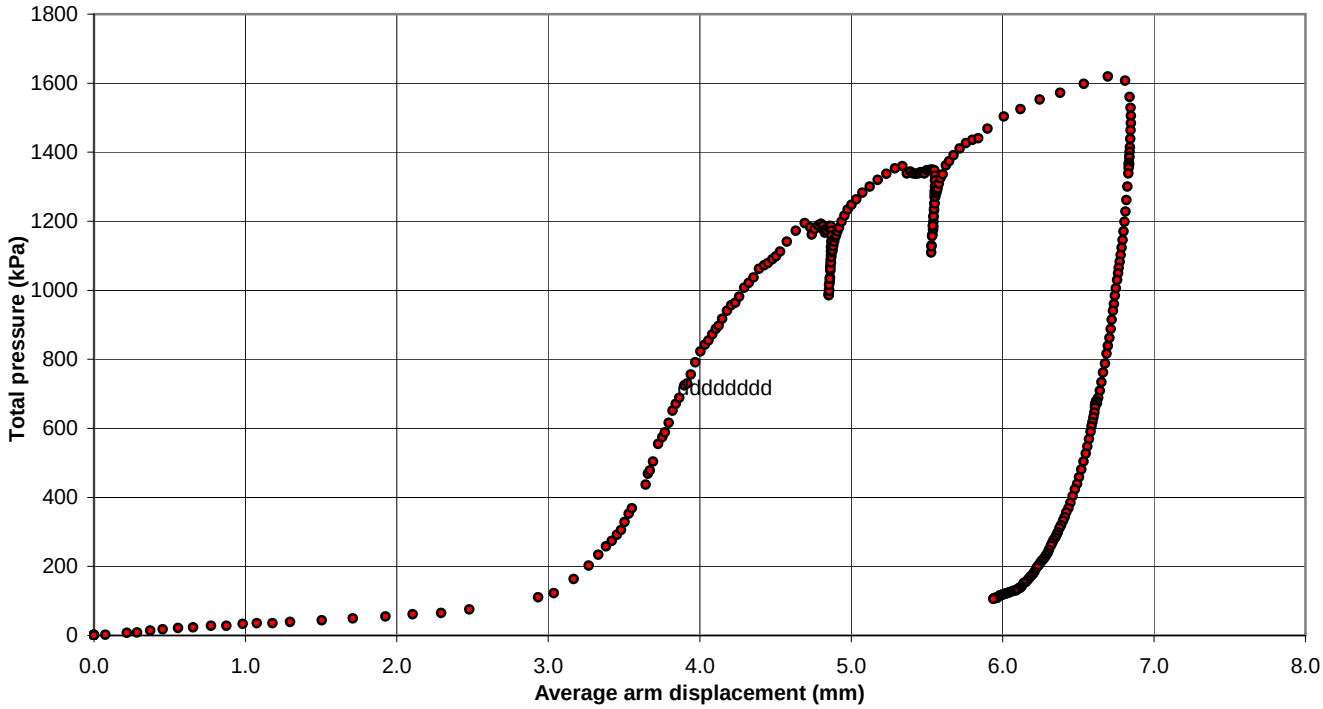
Table 1

Pressuremeter test analysis

SM Geocone

Date	11 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	201
Test	T201T1
Depth, m	6.35



Strength analysis

In situ horizontal stress, P_o (kPa)	422	Limit pressure, p_L (kPa)	2194	Undrained shear strength, c_u (kPa)	373
Initial modulus, G_i (MPa)	21				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	150	0.03	0.784	21				
2	130	0.05	0.756	19				

Remarks

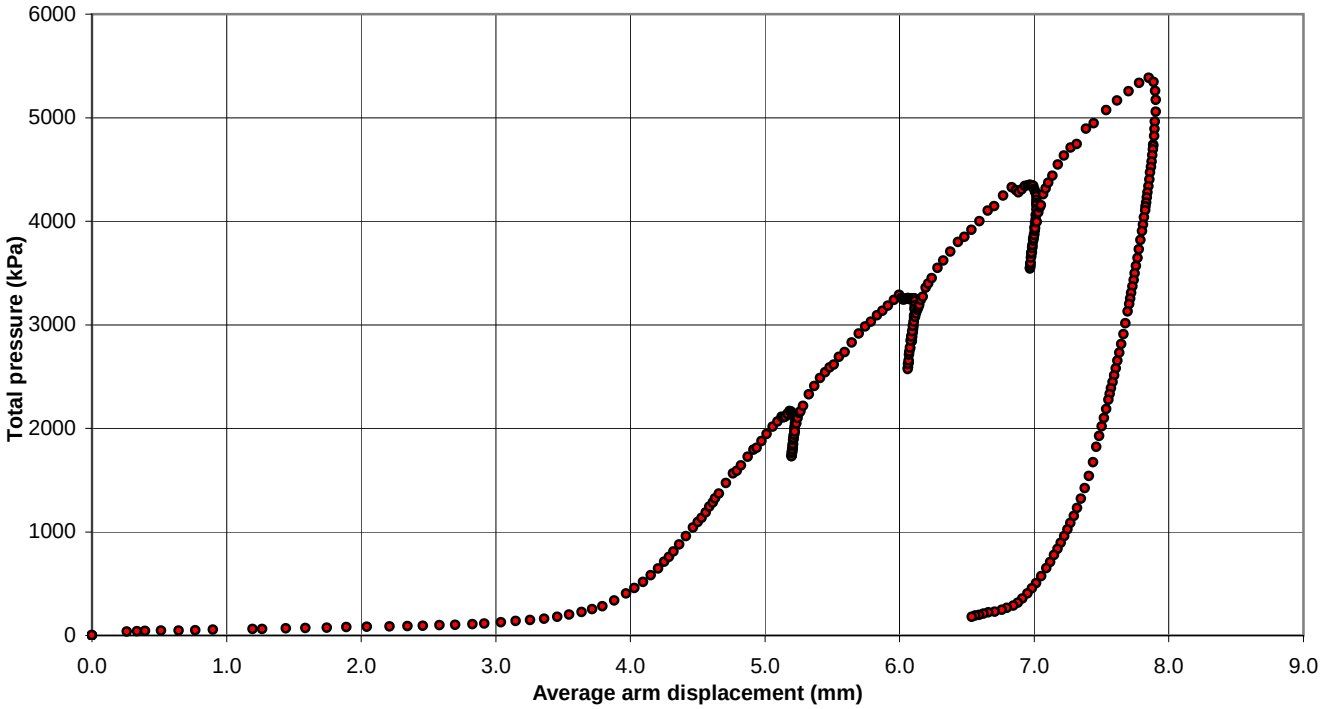
Notes:			
	Project	BARNSLEY MARKET PHASE 2	**Figure**
	Project No.	A8017	1
	Carried out for	1249 Regeneration Partnership LLP	

Pressuremeter test analysis

SM Geocone

Date	12 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	201
Test	T201T2
Depth, m	10.20



Strength analysis

In situ horizontal stress, P_o (kPa)	640	Limit pressure, p_L (kPa)	11124	Undrained shear strength, c_u (kPa)	3217
Initial modulus, G_i (MPa)	32				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	240	0.05	0.780	40				
2	200	0.11	0.849	72				
3	240	0.07	0.803	47				

Remarks

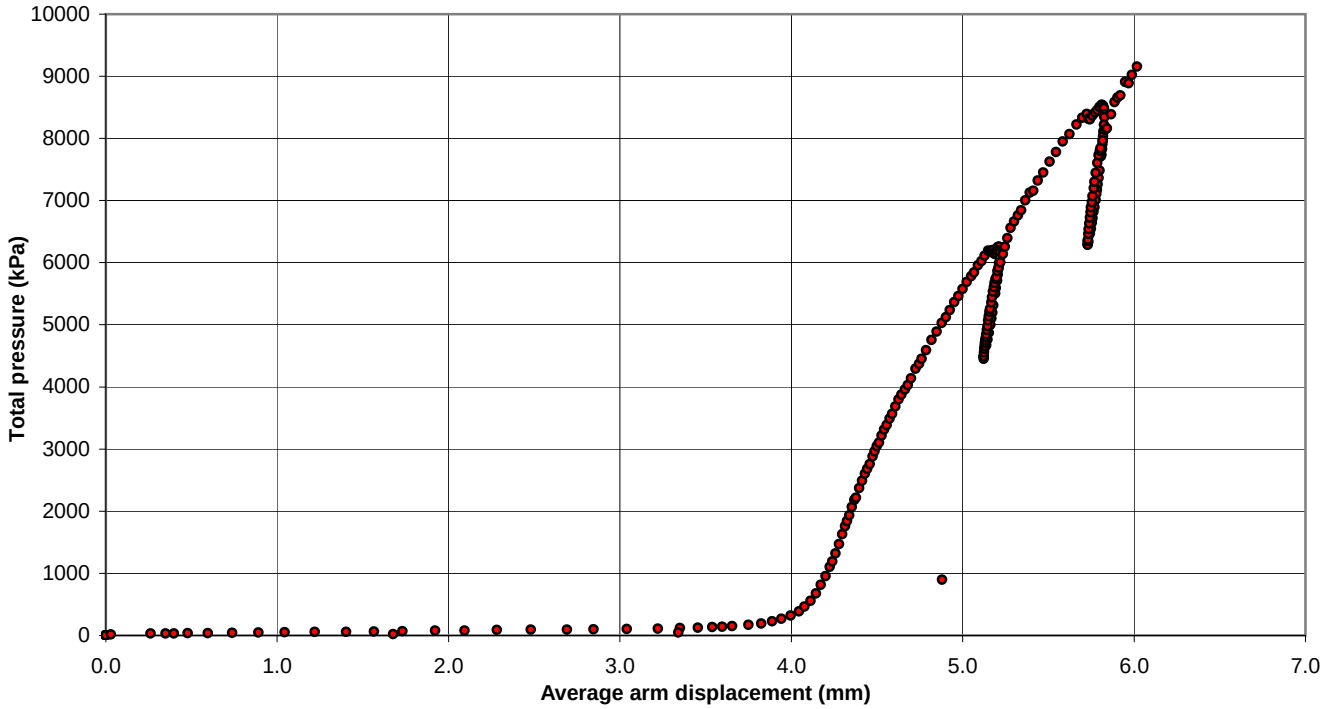
Notes:	**Project**	BARNSLEY MARKET PHASE 2	**Figure** 2
	Project No.	A8017	
	Carried out for	1249 Regeneration Partnership LLP	

Pressuremeter test analysis

SM Geocone

Date	12 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	201
Test	T201T3
Depth, m	14.20



Strength analysis

In situ horizontal stress, P_o (kPa)	1500	Limit pressure, p_L (kPa)	21000	Undrained shear strength, c_u (kPa)	4799
Initial modulus, G_i (MPa)	145				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	340	0.21	0.760	73				
2	400	0.22	0.732	74				

Remarks

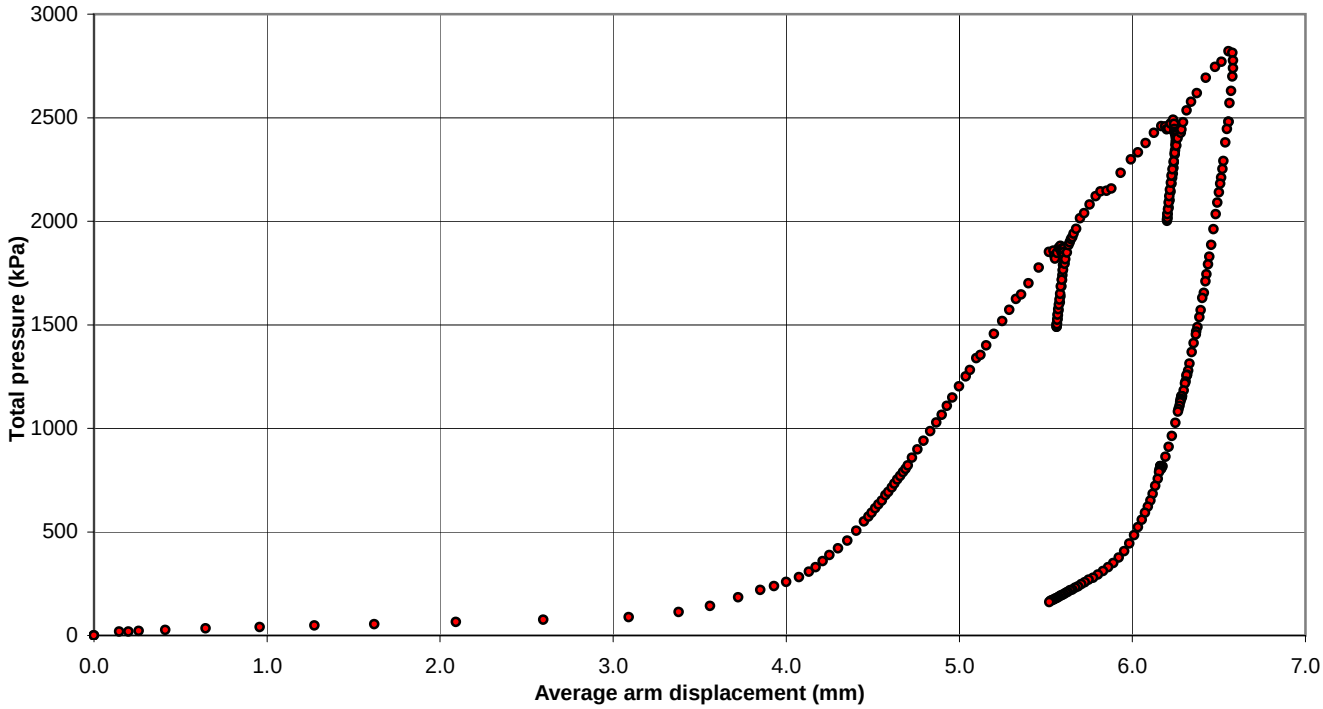
Notes:			Figure
	Project	BARNSLEY MARKET PHASE 2	
	Project No.	A8017	3
	Carried out for	1249 Regeneration Partnership LLP	

Pressuremeter test analysis

SM Geocone

Date	07 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	202
Test	T202T1
Depth, m	4.75



Strength analysis

In situ horizontal stress, P_o (kPa)	486	Limit pressure, p_L (kPa)	5701	Undrained shear strength, c_u (kPa)	1332
Initial modulus, G_i (MPa)	21				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	140	0.08	0.818	38				
2	150	0.11	0.788	32				

Remarks

Notes:

Project	BARNSLEY MARKET PHASE 2
Project No.	A8017
Carried out for	1249 Regeneration Partnership LLP

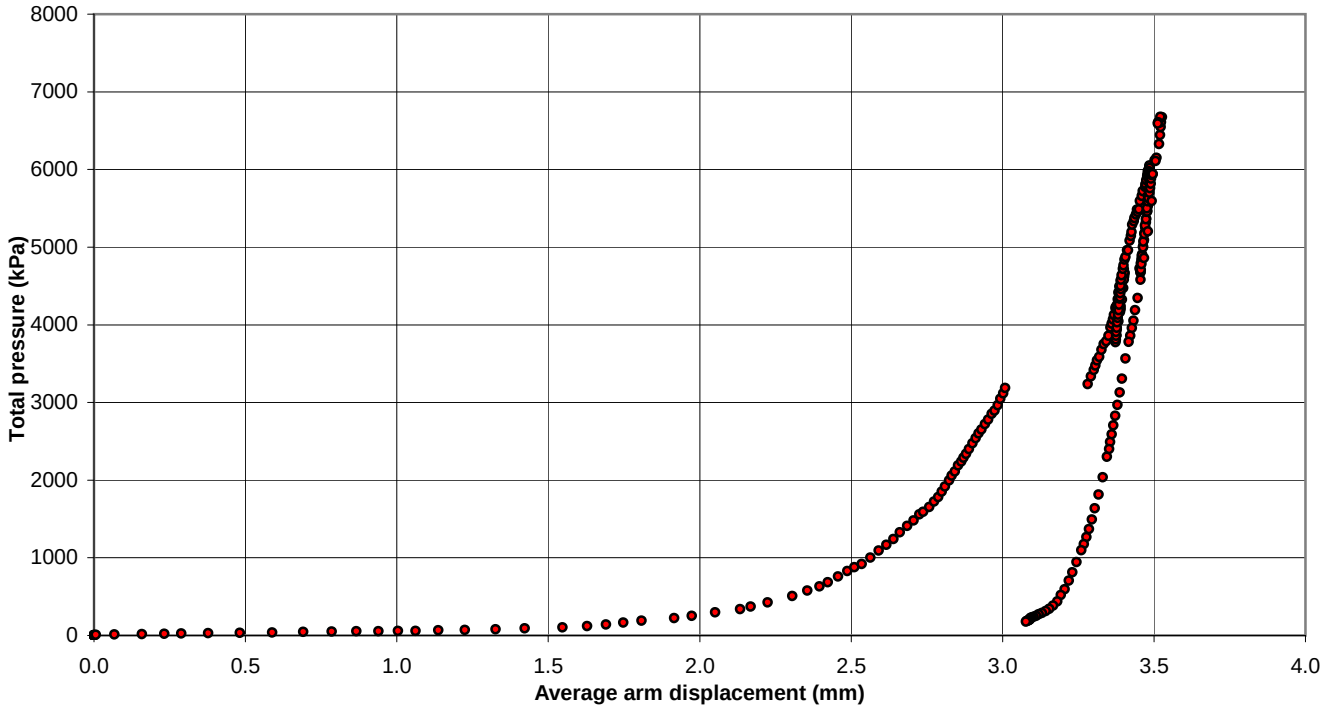
Figure 4

Pressuremeter test analysis

SM Geocone

Date	07 March 2008
Probe	HPD 940715
Material	Mud/silt/sandstone
Groundwater level for analysis, mbgl	1.21

BH	202
Test	T202T2
Depth, m	10.60



Strength analysis

In situ horizontal stress, P_o (kPa)	1552	Limit pressure, p_L (kPa)	41074	Undrained shear strength, c_u (kPa)	10616
Initial modulus, G_i (MPa)	137				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	800	0.04	0.794	141				
2	700	0.07	0.955	515				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

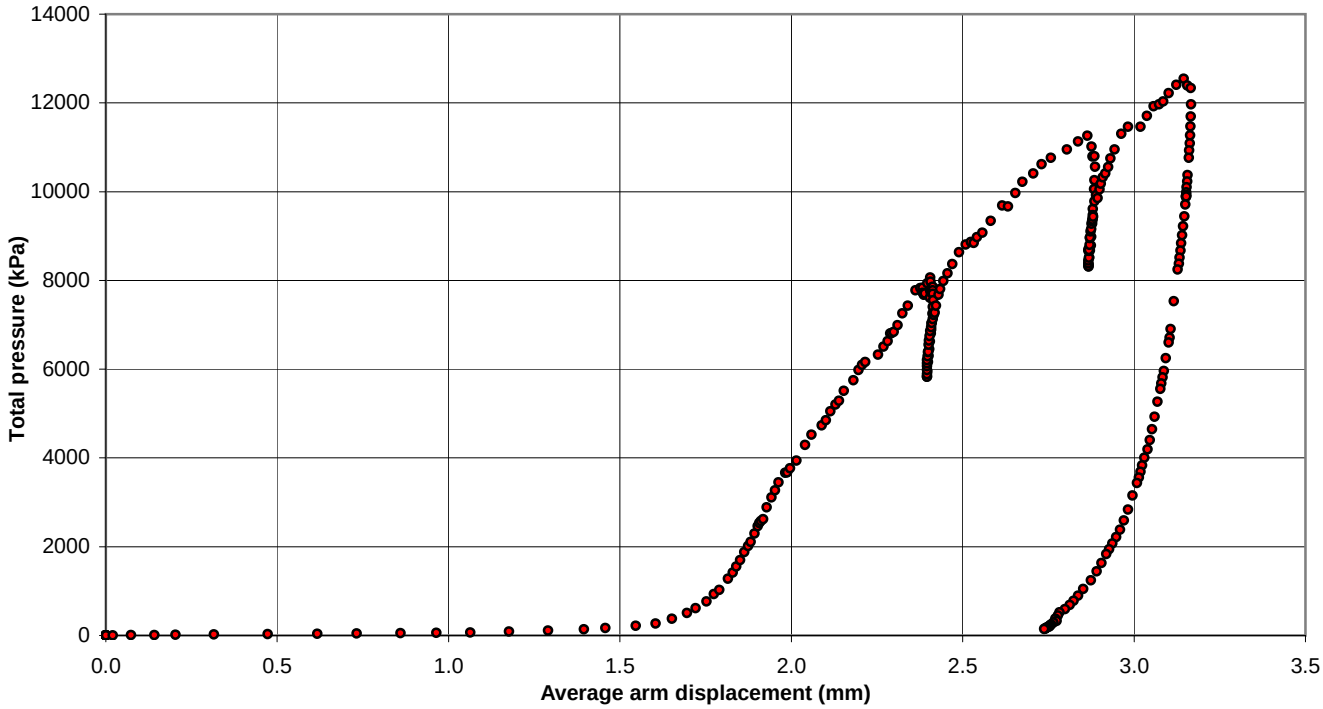
Figure 5

Pressuremeter test analysis

SM Geocone

Date	11 March 2008
Probe	HPD 940715
Material	Mud/siltstone
Groundwater level for analysis, mbgl	1.21

BH	202
Test	T202T3
Depth, m	12.20



Strength analysis

In situ horizontal stress, P_o (kPa)	1198	Limit pressure, p_L (kPa)	28906	Undrained shear strength, c_u (kPa)	6025
Initial modulus, G_i (MPa)	303				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	1600	0.03	0.442	13				
2	1700	0.03	0.565	38				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

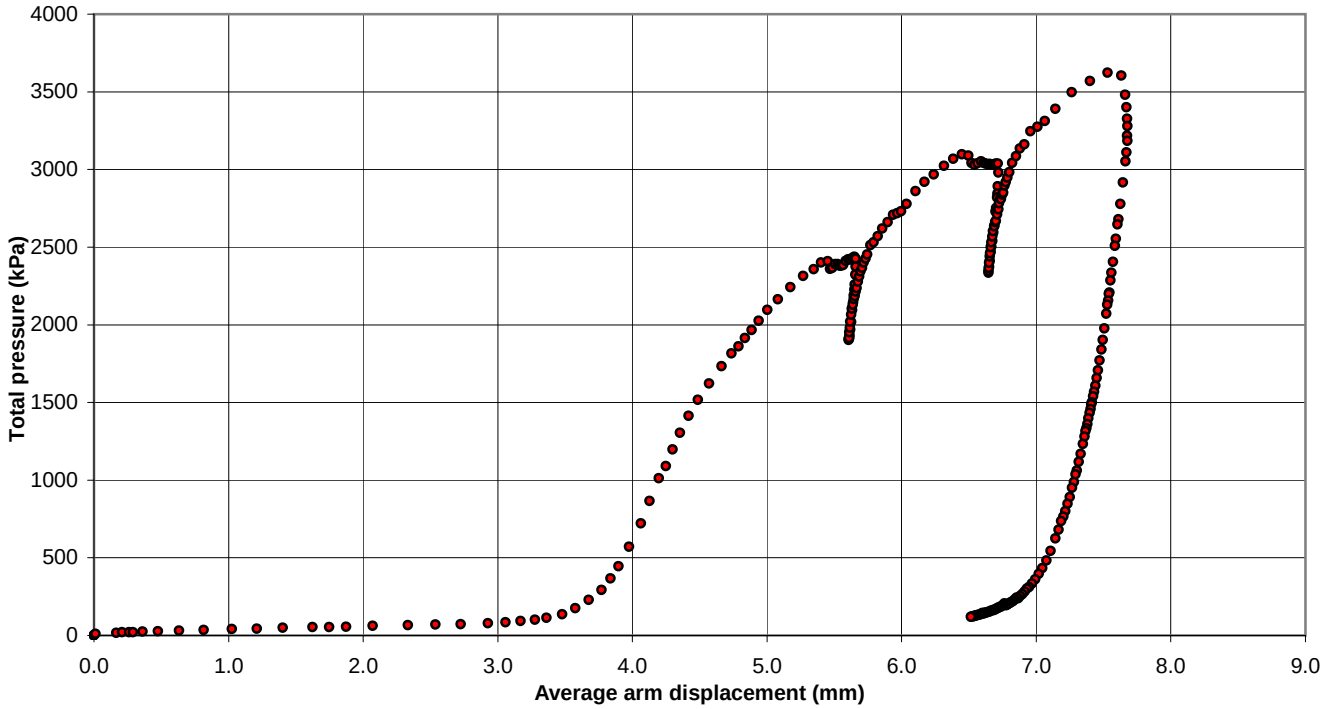
Figure 6

Pressuremeter test analysis

SM Geocone

Date	27 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	203
Test	B203T1
Depth, m	6.90



Strength analysis

In situ horizontal stress, P_o (kPa)	657	Limit pressure, p_L (kPa)	6231	Undrained shear strength, c_u (kPa)	1488
Initial modulus, G_i (MPa)	42				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	150	0.07	0.768	26				
2	160	0.09	0.656	11.6				

Remarks

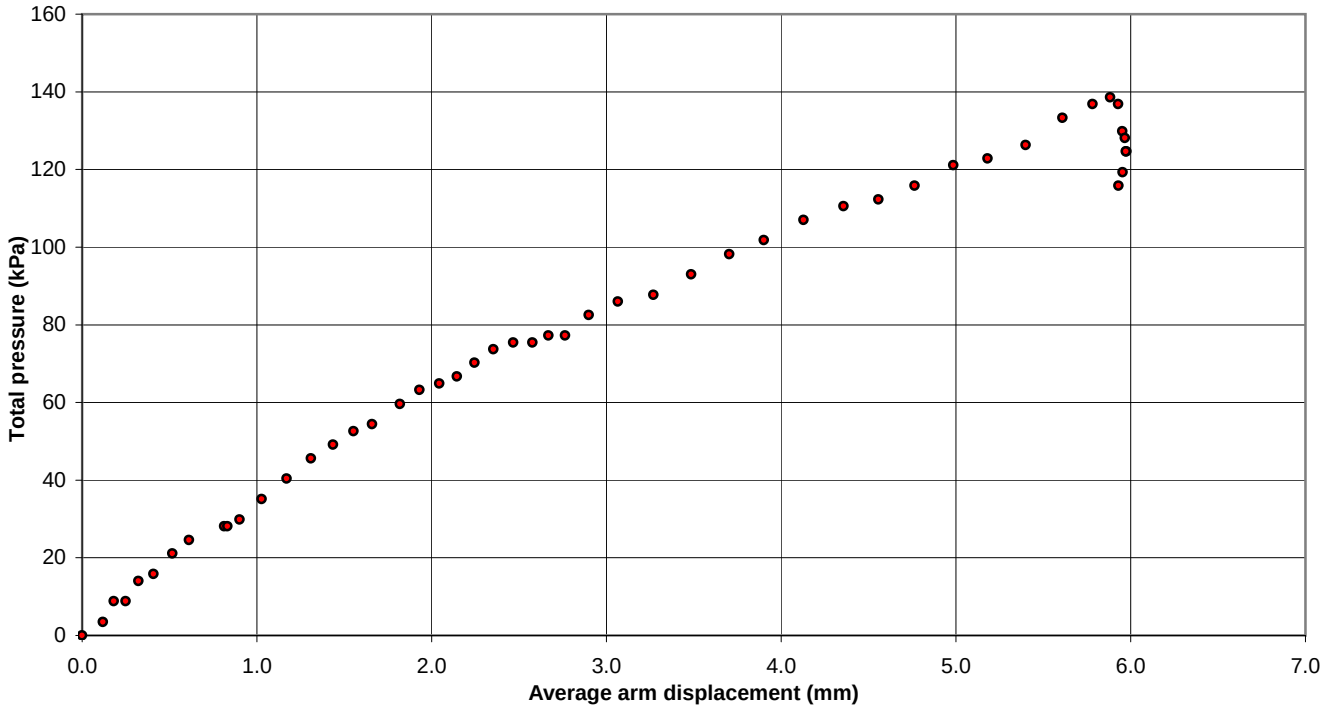
Notes:			Figure
	Project	BARNSLEY MARKET PHASE 2	
	Project No.	A8017	7
	Carried out for	1249 Regeneration Partnership LLP	

Pressuremeter test analysis

SM Geocone

Date	5 Mar 08
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	205
Test	T205T1
Depth, m	4.22



Strength analysis

In situ horizontal stress, P_o (kPa)		Limit pressure, p_L (kPa)		Undrained shear strength, c_u (kPa)	
Initial modulus, G_i (MPa)					

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				

Remarks

Test pocket disturbed. Data unsuitable for analysis.

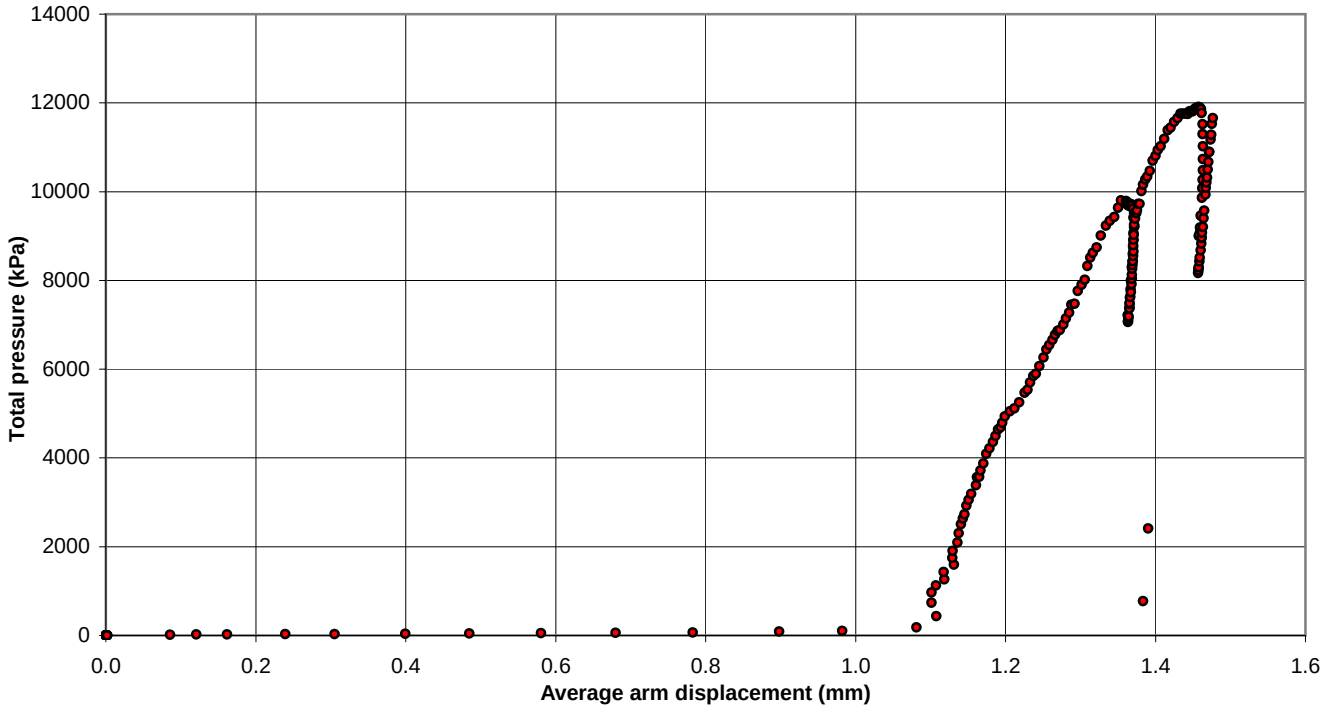
Notes:			
	Project	BARNSLEY MARKET PHASE 2	**Figure** 8
	Project No.	A8017	
	Carried out for	1249 Regeneration Partnership LLP	

Pressuremeter test analysis

SM Geocone

Date	06 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	205
Test	T205T2
Depth, m	10.20



Strength analysis

In situ horizontal stress, P_o (kPa)	2287	Limit pressure, p_L (kPa)	38210	Undrained shear strength, c_u (kPa)	4692
Initial modulus, G_i (MPa)	850				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	>3000	0.02	1.265	38952				
2	>3000	0.02	1.121	9376				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

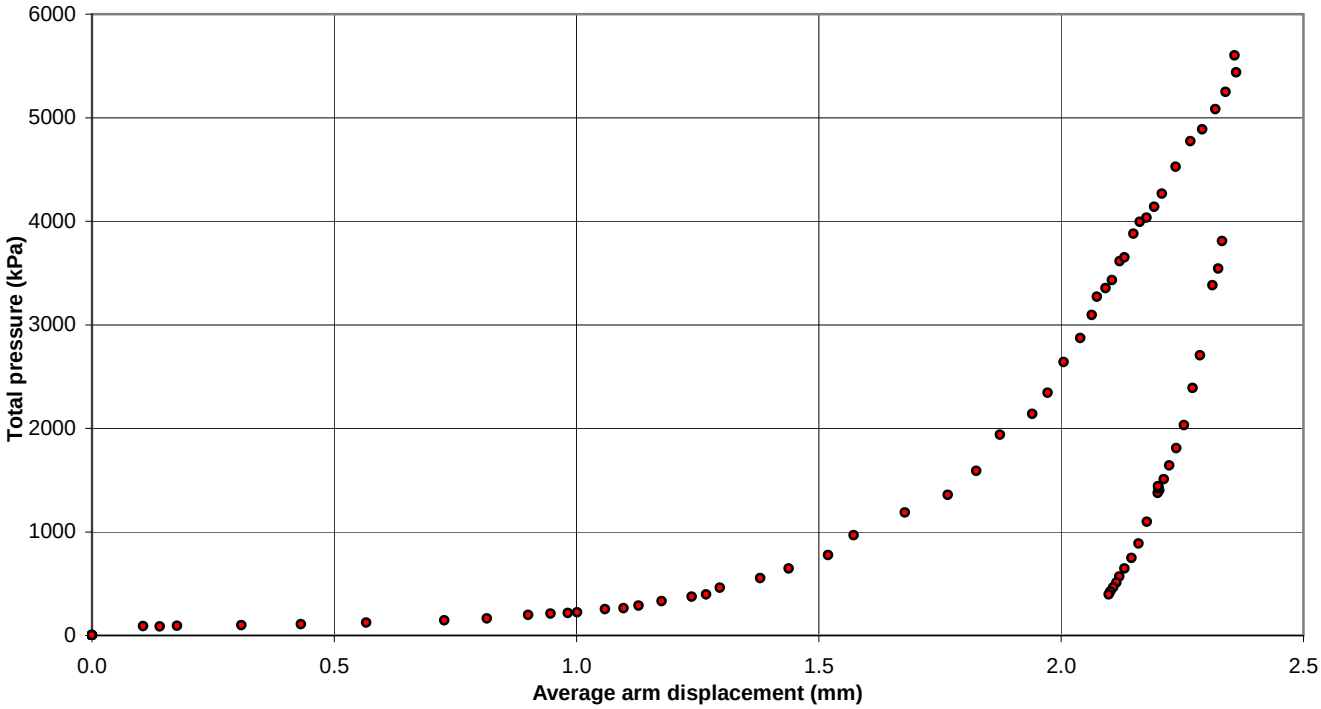
Figure 9

Pressuremeter test analysis

SM Geocone

Date	18 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	207
Test	B207T1
Depth, m	8.20



Strength analysis

In situ horizontal stress, P_o (kPa)	2000	Limit pressure, p_L (kPa)	15000	Undrained shear strength, c_u (kPa)	2612
Initial modulus, G_i (MPa)	154				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				

Remarks

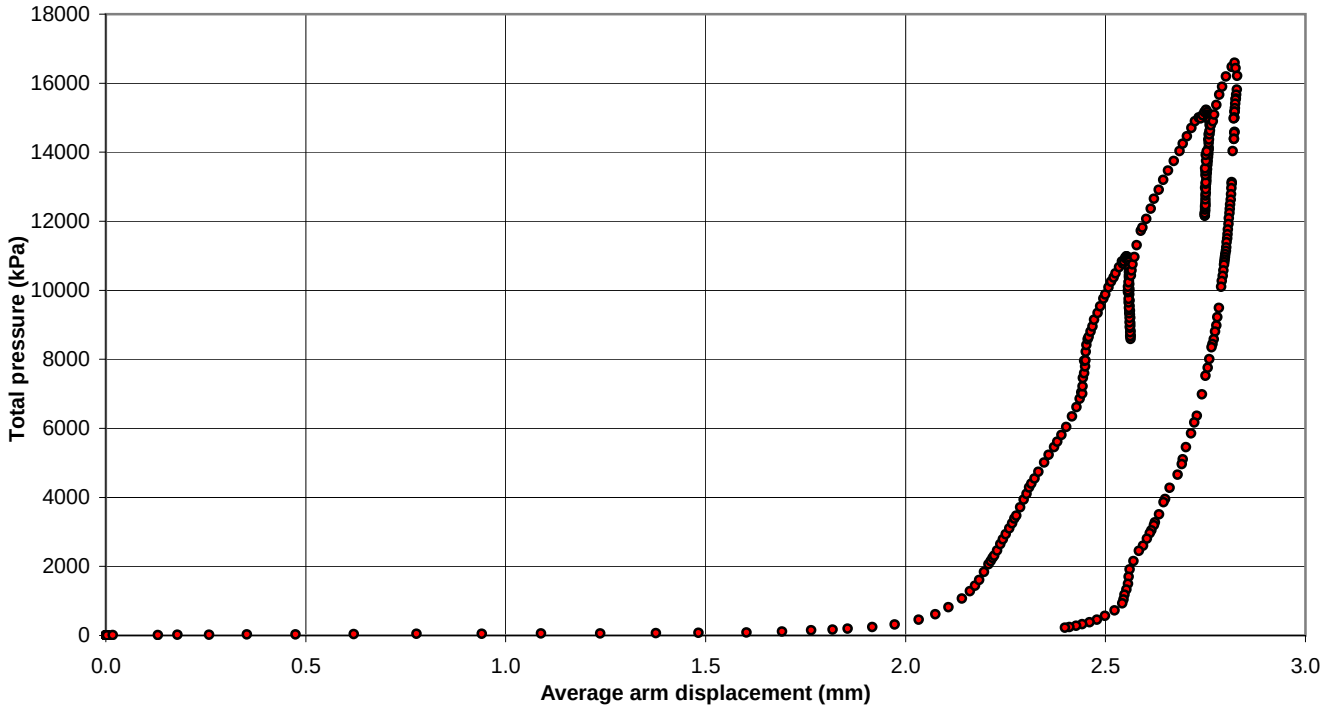
Membrane burst at 55 bar during initial loading. No unload-reload data for stiffness analysis.
Probably insufficient yield for reliable assessment of strength.

Pressuremeter test analysis

SM Geocone

Date	18 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	207
Test	B207T2
Depth, m	10.50



Strength analysis

In situ horizontal stress, P_o (kPa)	1300	Limit pressure, p_L (kPa)	49000	Undrained shear strength, c_u (kPa)	9553
Initial modulus, G_i (MPa)	448				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	>3000	NA	NA	NA				
2	>3000	0.009	NA	NA				

Remarks

Reverse movement during unload-reload loop 1

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

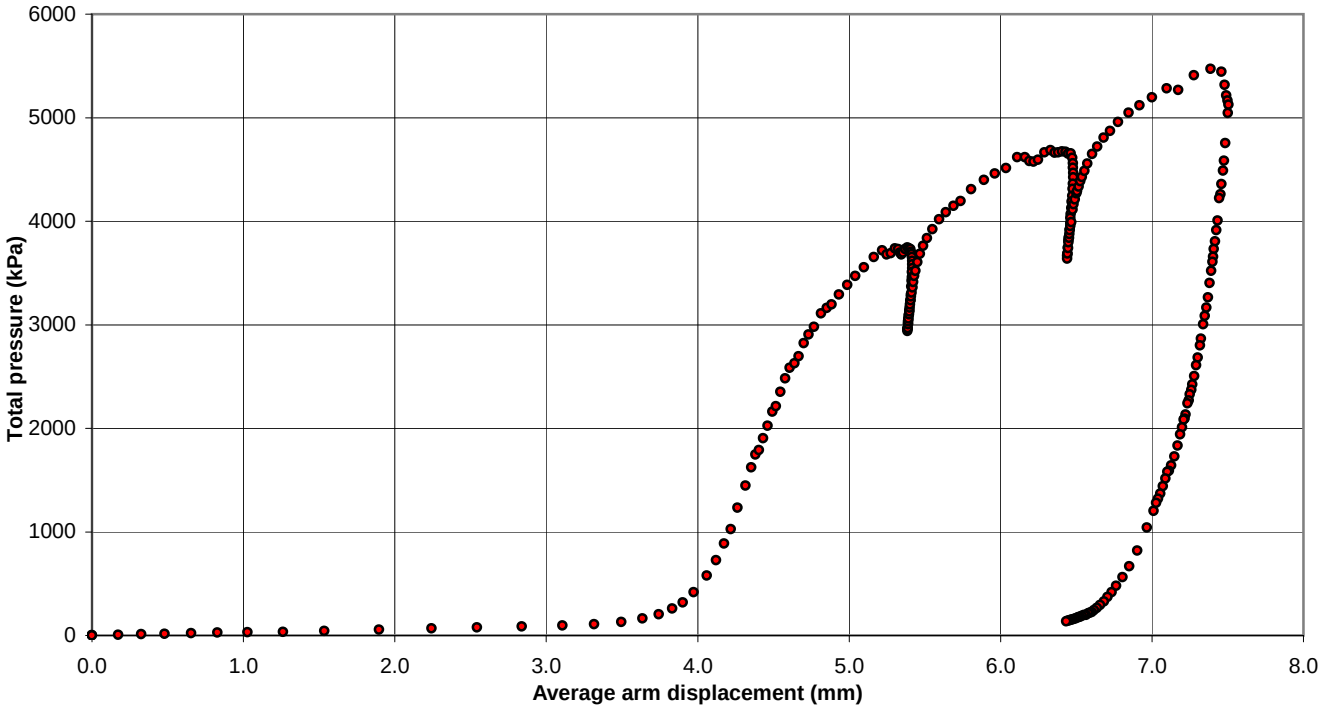
Figure 11

Pressuremeter test analysis

SM Geocone

Date	19 March 2008
Probe	HPD 940715
Material	Mud/siltstone
Groundwater level for analysis, mbgl	1.21

BH	207
Test	B207T3
Depth, m	14.00



Strength analysis

In situ horizontal stress, P_o (kPa)	1085	Limit pressure, p_L (kPa)	7984	Undrained shear strength, c_u (kPa)	1430
Initial modulus, G_i (MPa)	68				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	300	0.04	0.818	66				
2	320	0.04	0.829	74				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

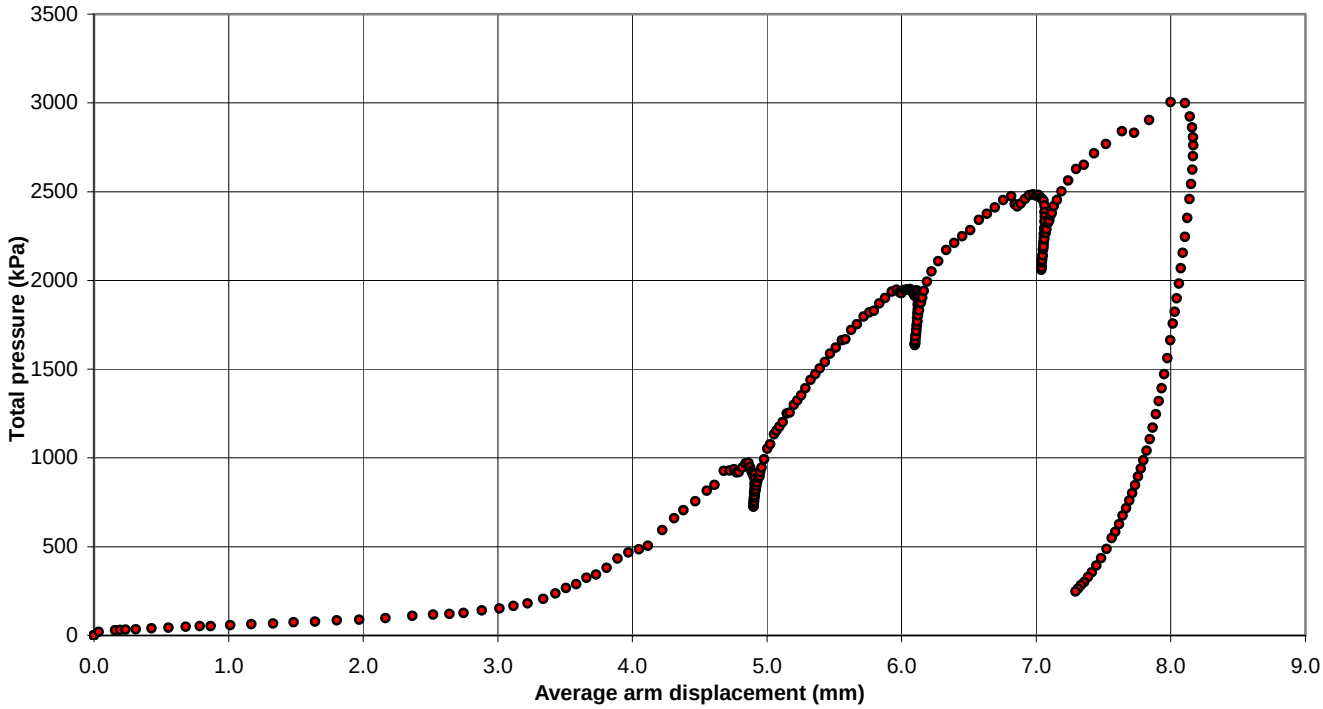
Figure 12

Pressuremeter test analysis

SM Geocone

Date	18 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	212
Test	B212T1
Depth, m	10.80



Strength analysis

In situ horizontal stress, P_o (kPa)	743	Limit pressure, p_L (kPa)	4814	Undrained shear strength, c_u (kPa)	1084
Initial modulus, G_i (MPa)	12				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	200	0.02	0.999	126				
2	180	0.03	0.917	99				
3	190	0.04	0.707	21				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

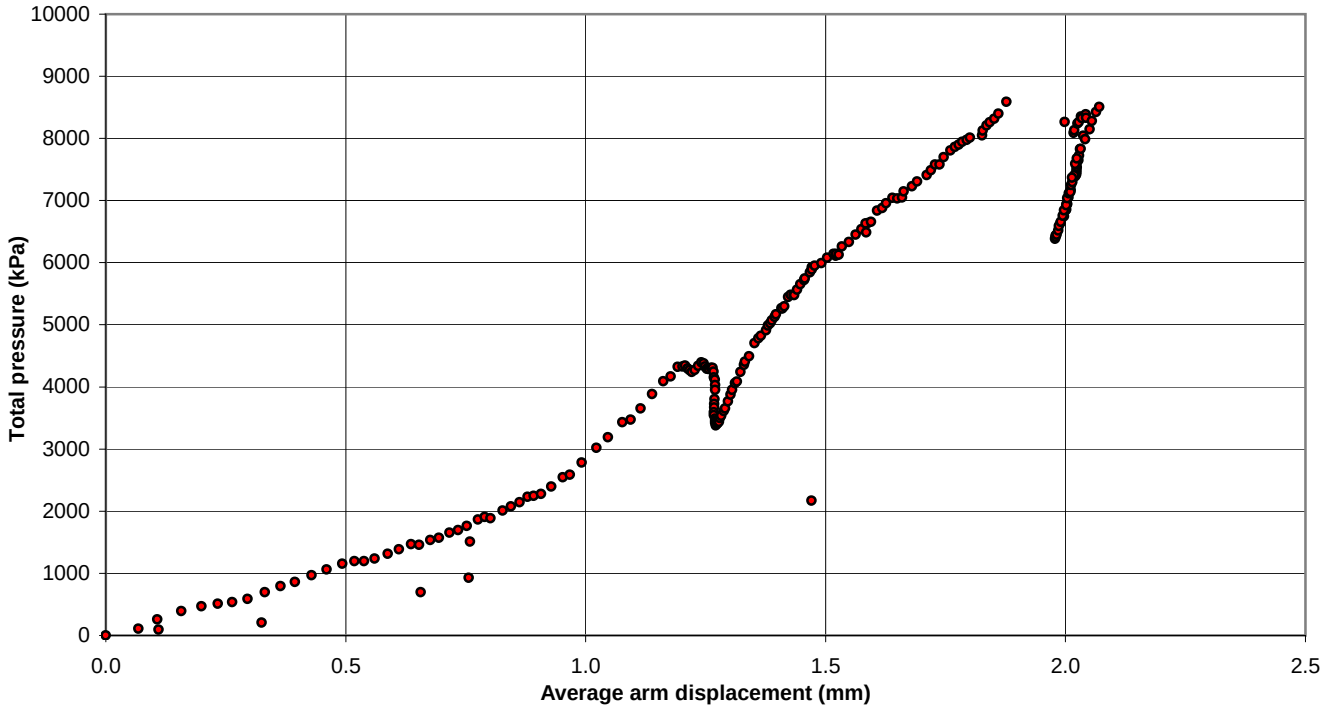
Figure 13

Pressuremeter test analysis

SM Geocone

Date	19 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	212
Test	B212T2
Depth, m	14.30



Strength analysis

In situ horizontal stress, P_o (kPa)	1139	Limit pressure, p_L (kPa)	29000	Undrained shear strength, c_u (kPa)	7762
Initial modulus, G_i (MPa)	51				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	300	0.079	1.193	1234				
2	480	0.098	1.005	463				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

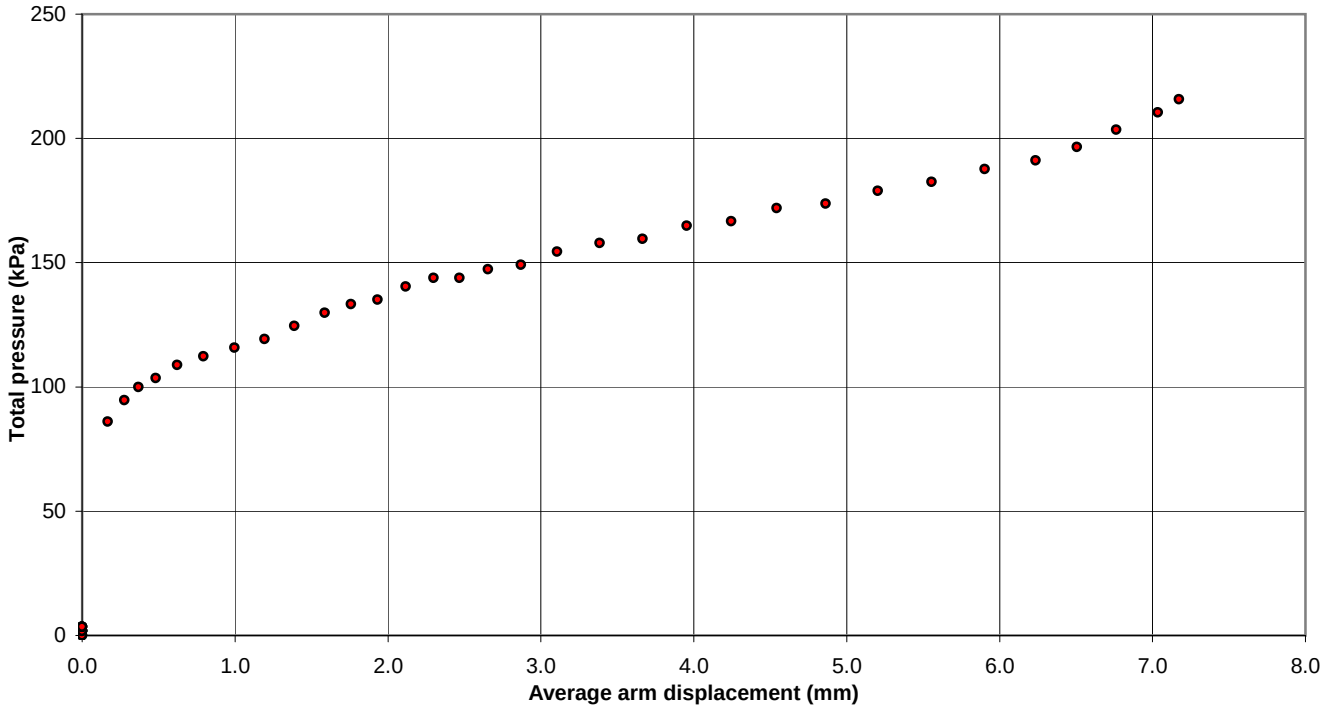
Figure 14

Pressuremeter test analysis

SM Geocone

Date	20 March 2008
Probe	HPD 940715
Material	
Groundwater level for analysis, mbgl	1.21

BH	212
Test	B212T3
Depth, m	17.50



Strength analysis

In situ horizontal stress, P_o (kPa)		Limit pressure, p_L (kPa)		Undrained shear strength, c_u (kPa)	
Initial modulus, G_i (MPa)					

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				

Remarks

Test pocket disturbed. Data unsuitable for analysis.

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

Carried out for 1249 Regeneration Partnership LLP

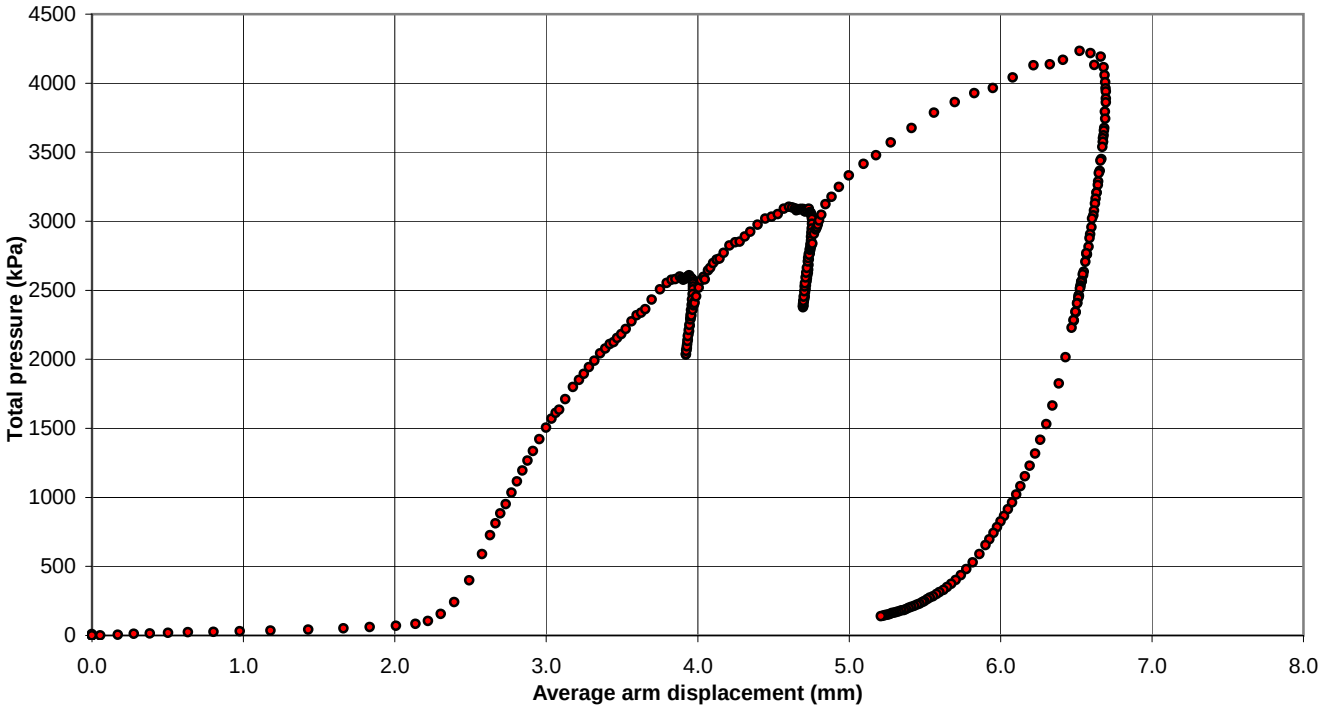
Figure 15

Pressuremeter test analysis

SM Geocone

Date	25 March 2008
Probe	HPD 940715
Material	Mud/siltstone
Groundwater level for analysis, mbgl	1.21

BH	219
Test	B219T1
Depth, m	9.50



Strength analysis

In situ horizontal stress, P_o (kPa)	1126	Limit pressure, p_L (kPa)	6797	Undrained shear strength, c_u (kPa)	1518
Initial modulus, G_i (MPa)	46				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	170	0.08	0.793	36				
2	180	0.11	0.812	50				

Remarks

Notes:

Project	BARNSLEY MARKET PHASE 2
Project No.	A8017
Carried out for	1249 Regeneration Partnership LLP

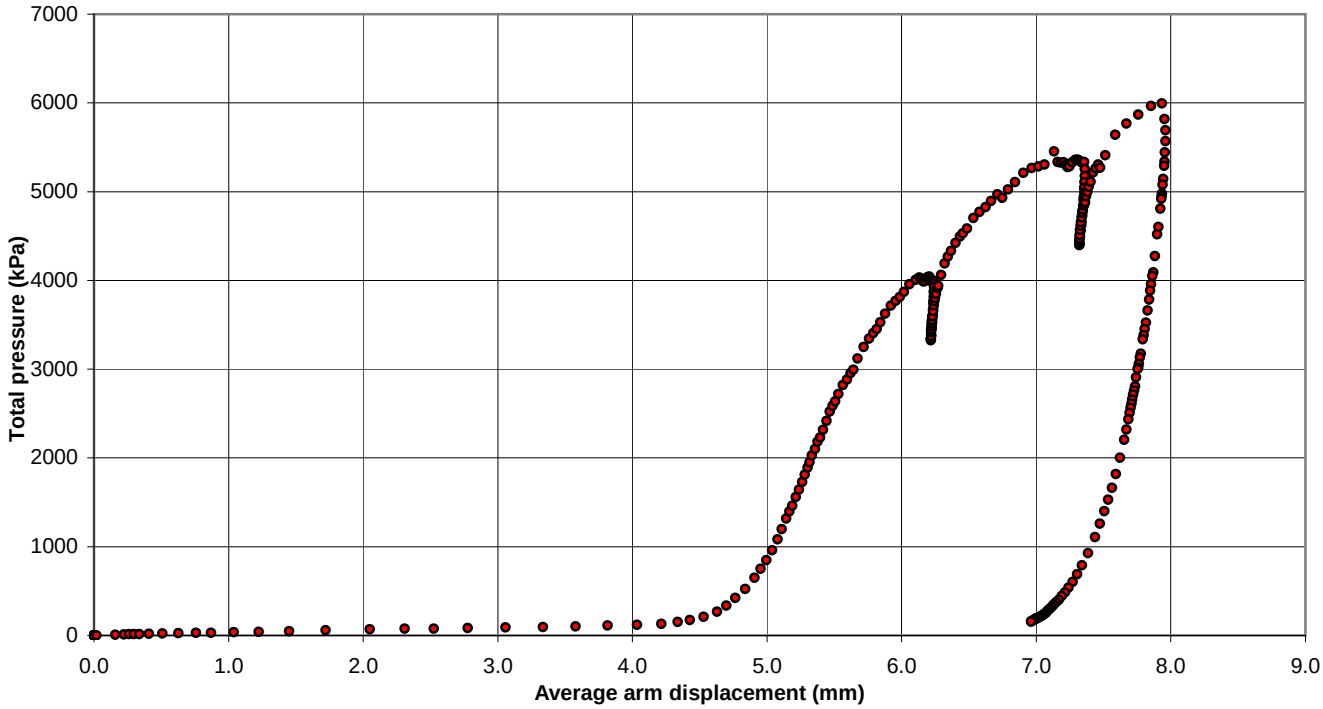
Figure 16

Pressuremeter test analysis

SM Geocone

Date	26 March 2008
Probe	HPD 940715
Material	Mud/siltstone
Groundwater level for analysis, mbgl	1.21

BH	219
Test	B219T2
Depth, m	12.85



Strength analysis

In situ horizontal stress, P_o (kPa)	1145	Limit pressure, p_L (kPa)	9655	Undrained shear strength, c_u (kPa)	1866
Initial modulus, G_i (MPa)	75				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	440	0.03	0.675	27				
2	300	0.07	0.649	20.158				

Remarks

Notes:

Project BARNSLEY MARKET PHASE 2

Project No. A8017

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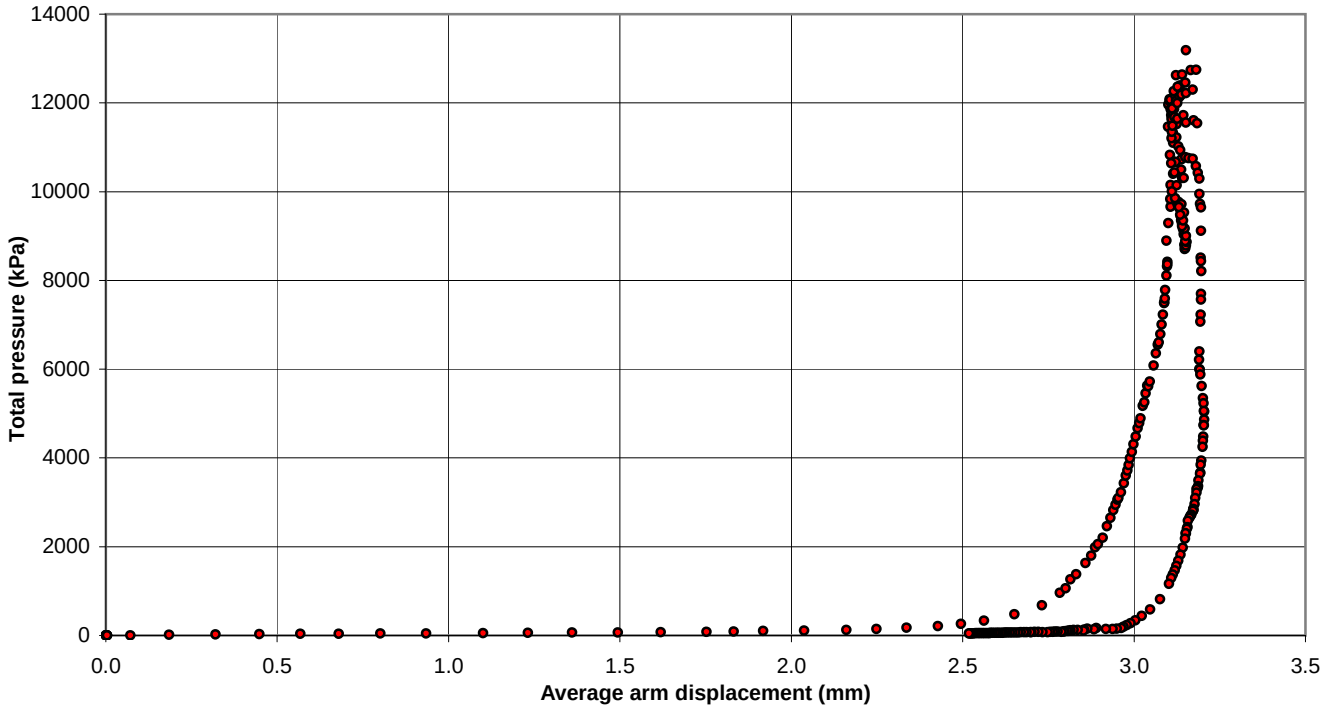
Figure 17

Pressuremeter test analysis

SM Geocone

Date	27 March 2008
Probe	HPD 940715
Material	Mudstone
Groundwater level for analysis, mbgl	1.21

BH	219
Test	B219T3
Depth, m	16.80



Strength analysis

In situ horizontal stress, P_o (kPa)	2987	Limit pressure, p_L (kPa)	137134	Undrained shear strength, c_u (kPa)	26304
Initial modulus, G_i (MPa)	532				

Shear modulus analysis

Loop ref	Shear modulus, G_{ur} (MPa)	Strain amplitude, ε_c (%)	Stiffness exponent, β	Shear stress constant, α (MPa)				
1	>3000	NA	NA	NA				

Remarks

Reverse movement during unload-reload loop

Notes:

Project BARNSLEY MARKET PHASE 2

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Figure 18

A BRIEF DESCRIPTION OF THE HIGH PRESSURE DILATOMETER AND THE INTERPRETATION OF TESTS IN ROCK

1. INTRODUCTION

The High Pressure Dilatometer (HPD) was developed in the 1980's and is conceptually a development of the Menard pressuremeter. Both the Menard pressuremeter and the HPD are cylindrical instruments which are lowered into a pre-drilled pocket. Menard pressuremeters normally have a maximum pressure capacity of 10 MPa and are used for testing soils. Displacement and pressure are measured remotely on the surface. The HPD has a pressure capacity of 20 MPa and both pressure and displacement are measured in the instrument. A test is carried out by pressurising a rubber membrane, which forms the central section of the instrument. This applies a pressure to the borehole walls causing a displacement of the wall. A test curve is formed by plotting radial strain against pressure.

A brief description of the equipment and its use is given below, together with details of the analyses used and an explanation of the graphical plots of results. For a fuller explanation of the use and interpretation of HPD tests the reader is recommended to consult Mair and Wood (1987) and the references quoted.

2. THE HIGH PRESSURE DILATOMETER

The HPD is approximately 1.6m long and has an external diameter of 73mm. The central 450mm of the instrument forms the expanding section. The pressure seal is provided by a cylindrical rubber membrane. The membrane is expanded by means of a rubber membrane. This is covered by strips of stainless steel which form a Chinese lantern and provide abrasion resistance for the membrane. A series of steel fingers (Christmas trees) are clamped to the membrane at each end to stop the membrane being extruded between the borehole wall and the HPD body by the applied pressure. Six strain arms at the mid point of the expanding section monitor the displacement of the membrane and hence the borehole wall. The arms are spaced at 60 degrees to allow diametrically opposed displacements in three directions to be determined. Also mounted in the instrument are two total pressure cells to monitor the applied pressure. Two cells are used for increased reliability. As the cells are mounted in the instrument, the reading is not affected by head losses in the hydraulic lines.

The electronic transducers are powered from the surface with a voltage regulator mounted in the HPD. The analogue electrical outputs from the transducers are amplified prior to being converted into a digital electrical signal by a 16 bit analogue to digital converter. The digital signals are sent to the surface as an RS232 serial data stream. The conversion of the analogue transducer signals into a serial digital signal in the HPD minimises electrical noise which can be developed in long wires and allows the signal to be connected directly to the logging micro computer with the minimum of additional electronics. All transducers are read at 10 second intervals.

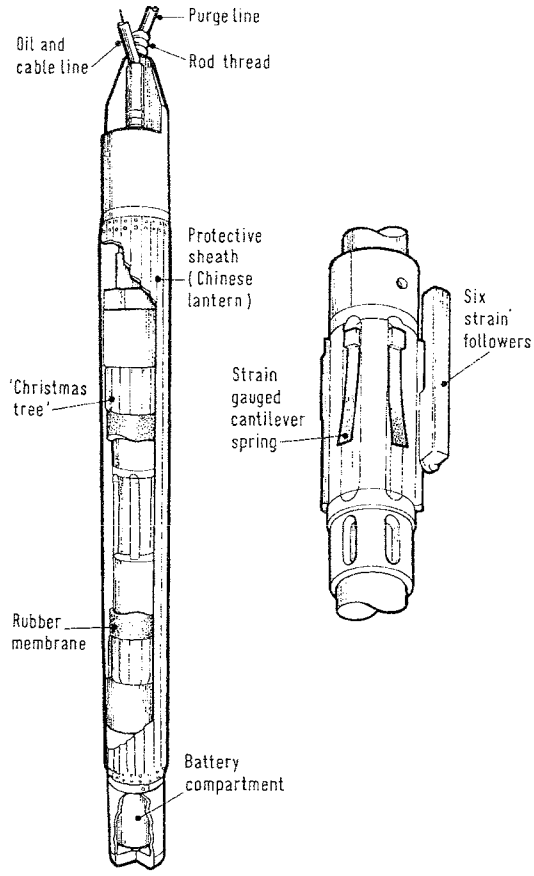


Figure A: The High Pressure Dilatometer (Cambridge Insitu)

3. TEST PROCEDURE

The test pocket is normally cored with an N size core barrel to produce a pocket of approximately 76mm diameter. Coring is normally preferred as experience has shown that better quality pockets are achieved using this drilling technique, however in some rock types a drag or tricone bit may give improved test pockets. In order to minimise disturbance and erosion of the borehole wall the pocket is normally drilled with a polymer based drilling mud in weak rocks and water in strong rocks. The minimum length of pocket drilled is 1.5m. On completion of drilling, zero readings for all transducers are noted at ground level. The HPD is lowered into the pocket and a check is made to ensure that the instrument has penetrated an adequate distance into the pocket. In some ground conditions the pocket may partially collapse and full penetration may not be achieved. A test is carried out if the HPD is 1.2m or more into the pocket. If this distance is not achieved, the membrane is not fully in the pocket and will burst if pressurised.

A test is carried out by pressurising the HPD. This is normally done with a hydraulic hand pump and oil. In certain circumstances compressed nitrogen gas is preferable, for example in dry holes where the head of oil would cause expansion of the HPD as it is lowered down the borehole. Pressure is gradually applied and the membrane comes into contact with the borehole wall. As the test continues the applied pressure is increased. At intervals during the loading curve the pressure is held constant for a period of 30 seconds. These are referred to as creep intervals and are carried out at equally spaced pressure increments such that there are approximately 20 sets of readings. During loading it is normal to carry out unload-reload loops to provide an estimate of unload-reload shear modulus. Most weak rocks exhibit some

creep and a constant pressure is maintained prior to carrying out an unload-reload loop to allow creep of the rock to occur. The loop is performed when the creep has become negligible. This procedure reduces the influence of creep on the form of the unload-reload loop.

4. CALIBRATIONS

4.1 Transducer Calibrations

It is necessary to calibrate the transducers to allow the electrical signals to be converted into engineering units. This is normally carried out at the start and on completion of projects. It is not normally necessary to calibrate the transducers during a contract as the voltage outputs from the transducers are independent of cable lengths and other transducers.

Strain arms are calibrated by means of a pair of micrometer screw gauges. The micrometers are mounted in a jig over the relevant strain arm and ensure the arm remains parallel to the body of the HPD. Readings taken at either 0.5mm or 1rnm increments up to the limit of movement of 12mm. A further set of readings are taken as the arm is returned to its seat.

Pressure transducers are calibrated by pressurising the HPD in a rigid cylinder to the pressure required for the relevant test programme. Readings of pressure transducers are taken at pressure intervals during the application and release of the pressure. The pressure is measured on a calibrated 0.25% accuracy pressure gauge and the pressure is held constant for a period of time to ensure that head losses in the hydraulic hose do not give an incorrect reading from the transducer. Both pressure transducers are calibrated at the same time.

The normal change in calculated calibration constants is less than 2%. This is considered to be within the accuracy that pressure gauges can be read and micrometers positioned on the strain arms. Therefore the error between calibrations is usually insignificant and an average value based on a series of calibrations is used. Small changes in zero readings occur and these are corrected at final calibration stage. The sensitivity of the transducer is not affected by small changes in zero readings.

4.2 Membrane Calibrations

Each membrane used has slightly different characteristics. It is necessary to compensate for this by membrane calibrations. These calibrations allow for the pressure required to expand the membrane in air and the compression of the membrane under the applied pressure.

The membrane stiffness calibration is carried out by expanding the HPD in air. This calibration gives two values. Firstly the pressure required to lift the membrane off the body of the HPD is noted and expressed in kPa. Secondly the pressure required to continue the expansion is noted. This is expressed as kPa/l0mm. It is necessary to calculate this value by extrapolation of the expansion curve as the strain arms do not extend to 10mm. Typical values are 40kPa for lift-off pressure and 100kPa/l0mm for expansion stiffness.

This calibration is applied to the measured pressure from the total pressure cell. Thus at the start of the test the total pressure is 0kPa and displacement is 0mm. If the lift-off pressure is 40kPa then the corrected pressure is recorded as -40kPa. Similarly as the test proceeds, and displacement increased to 5mm and an recorded pressure of 200kPa, the corrected pressure, with an expansion stiffness of l00kPa/l0mm would be (200 - 40 - 100 x 5/10) 90kPa.

The membrane compression calibration is carried out by pressurising the HPD in an aluminium cylinder. The compression of the membrane is determined by plotting pressure against strain arm displacement. This is expressed as mm/GPa and a reduction of 2mm/Gpa is made to allow for expansion of the cylinder. Average values of strain arm displacement are used for this calibration as it is not possible to secure the calibration cylinder sufficiently rigidly to the HPD to prevent relative movements of the HPD and cylinder having a significant effect. Typical values are of the order of 5mm/GPa. This is equivalent to a modulus of 4GPa. To apply the calibration the observed displacement of the strain arm is reduced according to the compression correction and the applied pressure. In weak rocks this correction is not significant. However in stronger rocks the correction becomes significant and it may be desirable to perform the calibration after every test to reduce the uncertainty of this calibration.

5. ANALYSIS

5.1 Introduction

The calibrated data is stored on floppy disks as ASCII characters. This allows the data to be imported into most popular spreadsheet programmes as well as into the dedicated computer analysis programme. Data is stored in engineering units with pressure expressed as kiloPascals and displacements as millimetres. The data is stored in a [test name].PRN file. The test name takes the form B*T* with the borehole number and test number used to complete the file name, for example B4T8.PRN.

A typical sample of calibrated test data is given below. The first line of the file contains the test name, the depth of the test and the date. This is followed by zero readings and calibration constants for arms I to 6 and total pressure cells (TPC) A and B. The arrow adjacent to total pressure cell A indicates that the output from this cell has been used when calibrating the raw data. This section also includes the membrane calibrations. The lift-off correction is shown in the third column, followed by the membrane stiffness correction. The last column gives the membrane compression calibration. Individual membrane calibrations can be used for each arm. In practice it is normal to use an average value as the membrane lift-off and stiffness corrections are adequately expressed as an average. As discussed in the previous section only average values are used for membrane correction.

Calibrated data listings follow the calibration information. The first column gives the line number of the data. Readings are taken at 10 second intervals, therefore the time from the start of a test is related to the line number. The six subsequent columns give the displacement of each individual arm. The displacement is expressed in millimetres. The small displacement recorded in this example, at the start of the test, represents a very small expansion of the membrane due to the head of oil between the surface and the HPD. The last column records the total pressure measured in the HPD. A reading of 190kPa has been given by the total pressure cell in this example. This corresponds to the calculated head of oil at this depth and demonstrates the accuracy of the total pressure cell over 1% of its operating range.

INSTRUMENT CALIBRATIONS: B4T8 DEPTH: 21.60m DATE: 6 May 99

	CALIBRATIONS			MEMBRANE CORRECTION	COMPRESSION
ARM 1	-892.2 mV and 193.3	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
ARM 2	-1611.4 mV and 248.0	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
ARM 3	-1051.6 mV and 215.8	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
ARM 4	-1292.8 mV and 203.0	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
ARM 5	-1253.5 mV and 226.2	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
ARM 6	-1015.6 mV and 202.6	mV/mm		45.0 kPa and 136.0/10mm	3.6 mm/GPa
TPC A	-653.6 mV and 56.7	mV/mm	<---		
TPC B	-714.2 mV and 54.6	mV/mm			

	ARM						TOTAL
LINE	1	2	3	4	5	6	PRESSURE
1	0.0359	0.0100	0.0030	0.0308	0.0104	0.0160	190
2	0.0364	0.0100	0.0044	0.0304	0.0100	0.0155	190
3	0.0359	0.0100	0.0044	0.0308	0.0100	0.0155	190
95	1.7881	1.4479	1.0394	1.0835	0.7677	1.2879	2434
96	1.7921	1.4535	1.0438	1.0886	0.7727	1.2934	2471
97	1.7975	1.4587	1.0473	1.0924	0.7772	1.2985	2499
98	1.8024	1.4636	1.0513	1.0970	0.7814	1.3049	2527
99	1.8073	1.4688	1.0557	1.1013	0.7855	1.3096	2556
100	1.8118	1.4733	1.0593	1.1047	0.7886	1.3134	2566
101	1.8150	1.4772	1.0629	1.1073	0.7913	1.3173	2571
102	1.8177	1.4797	1.0646	1.1086	0.7929	1.3195	2566
103	1.8200	1.4811	1.0662	1.1112	0.7952	1.3217	2566
104	1.8218	1.4829	1.0678	1.1129	0.7971	1.3234	2571
105	1.8232	1.4846	1.0686	1.1133	0.7983	1.3251	2564
106	1.8242	1.4852	1.0688	1.1139	0.7984	1.3253	2513
107	1.8238	1.4856	1.0689	1.1140	0.7989	1.3258	2496
108	1.8240	1.4854	1.0690	1.1133	0.7990	1.3263	2453
109	1.8236	1.4855	1.0691	1.1121	0.7984	1.3260	2416
110	1.8238	1.4849	1.0688	1.1109	0.7981	1.3262	2370
111	1.8239	1.4844	1.0690	1.1098	0.7968	1.3255	2312
112	1.8237	1.4842	1.0692	1.1087	0.7958	1.3257	2247

For analysis, arm readings are averaged as opposing pairs to compensate for movement of the body of the HPD which forms the reference for individual arms. Thus arms readings are averaged as 1 & 4, 2 & 5, and 3 & 6.

Tests are analysed using a computer programme developed by Cambridge Insitu. This programme is designed to assist in the execution of standard analyses and to produce graphical plots of the data and summary results. The calibrated data is imported from the * .PRN files described above.

On importing the calibrated data it is necessary to identify different sections on the curve to assist the programme. The various data points used during and HPD test are represented by the following symbols:-

+	Normal data point on the loading curve.
/	Data point on unloading curve.
V	Data point on unload-reload loop.
>	Data point on creep stage.

Plots are presented for total pressure verses strain for the full expansion curve and strain verses time. Subsequent sheets present the individual plots used in the various analyses carried out. Plots are presented for both an average of all six arms and an average of the

three arm pairs. Summary results are presented with each test for an average of all six and for the arm pairs. Average results, for all tests in a borehole, are presented in the results summary.

The following comments on the analyses are intended to explain briefly the plots presented and are not intended as a full explanation. For further details the reader is recommended to consult the various references quoted and other available texts, for example Mair and Wood (1987).

5.2 Estimation of In Situ Horizontal Stress

The estimation of in situ horizontal stress is normally carried out using the Marsland and Randolph (1977) method. The lift-off and excess pore water pressure methods, used with the self boring pressuremeter, are not appropriate. The lift-off method requires that no stress relief occurs at the borehole wall, clearly this is not the case with a HPD. The excess pore water pressure method is not suitable as no pore pressure cells are fitted to the HPD and because excess pore pressures will not be generated until yield has occurred.

The Marsland and Randolph method was developed to estimate in situ horizontal stress from Menard pressuremeters operating clay. It has been modified by Hawkins et al (1990) who applied the analysis to a self boring pressuremeter. The analysis is based on the assumption that the initial loading curve is linear and therefore elastic. At the point at which the curve ceases to be linear (the yield point), plastic deformation occurs and the total radial stress is assumed to be equal to the horizontal stress plus the undrained shear strength. Marsland and Randolph used the ultimate undrained shear strength (i.e. the Gibson and Anderson, 1961 method) to calculate the in situ horizontal stress. Hawkins et al consider that the undrained shear strength at yield is more correctly given using a subtangent analysis (Palmer 1972). This should theoretically give the undrained shear strength at this point. An iterative approach is required as estimation of the location of the horizontal stress alters the position of the borehole wall and hence the cavity volume used to calculate the shear strength.

When using this analysis in a rock caution should be exercised. Both methods used to calculate undrained shear strength assume that the rock behaves as an elastic perfectly plastic medium and that no drainage or volume change occurs. This is unlikely to be the case in a rock and therefore some uncertainty exists in the calculated value. Any error will be reflected in the value given for the in situ horizontal stress.

The following values are identified on the graph:

G_j	Initial shear modulus represented by linear portion of curve
P_f	Yield point
P_o	Estimated horizontal stress
T_f	Shear strength at yield point

Theoretically the correct estimate of horizontal stress is made when:-

$$P_o = P_f - T_f$$

A typical plot of the modified Marsland and Randolph analysis is shown in Figure B. The box in the bottom right hand comer illustrates the estimation of T_f.

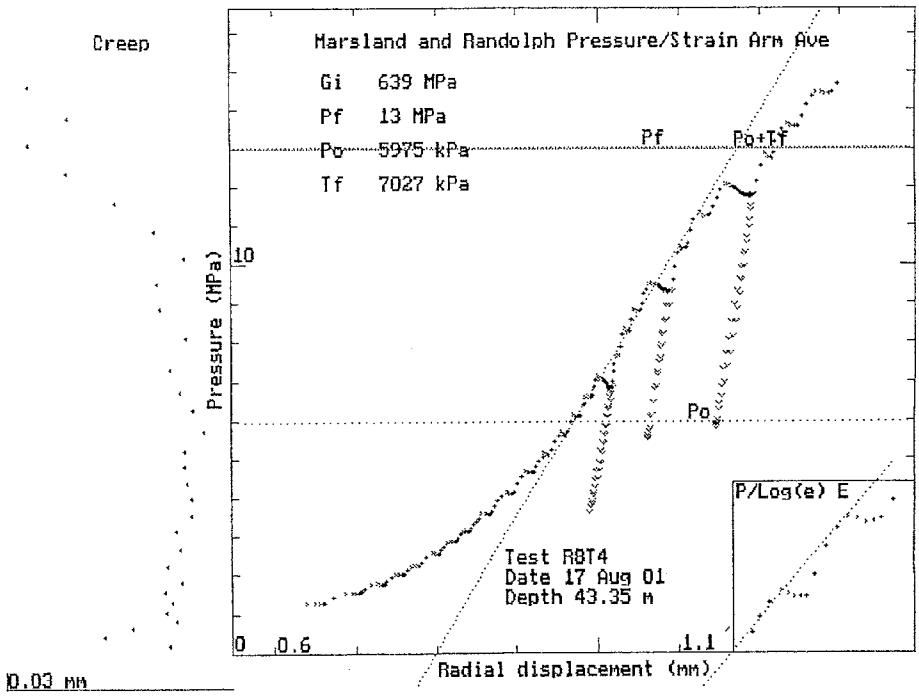


Figure B: Modified Marsland and Randolph Method

On the left of the main plot is the creep curve. This curve plots the creep recorded during a 30 second creep stage. As the HPD is pressurised to bring the membrane into contact with the borehole wall, some' creep' occurs in the rubber membrane. During the period in which the rock is behaving elastically, no excess pore water pressures will be generated. This will be reflected in the creep curve as a reduced creep rate. As the pressure is further increased, yield will occur and excess pore pressure will be generated. The dissipation of this pore water will result in an increased 'creep' rate. The section of the curve which shows the minimum creep rate can therefore be used to assist in identifying the in situ horizontal stress and the yield point.

In some rocks, it is not possible to identify a clear yield point on the initial loading curve. Alternatively the pressure capacity of the HPD may, in some stronger rocks, be insufficient to cause yield of the rock. If this is the case it is not possible to use the Marsland and Randolph analysis. In such cases the in situ horizontal stress is normally estimated on the basis of the creep curve or the pressure recorded at the point at which the loading curve becomes linear.

5.3 Shear Modulus

When discussing modulus, it is important to appreciate that the pressuremeter test fails the soil in pure shear. Therefore only shear modulus is quoted. Estimation of elastic modulus requires an assumption to be made for Poisson's ratio (ν) and the following relationship:

$$E = 2 \times G (1 + \nu)$$

Shear modulus is determined both for the initial loading curve and from unload-reload loops. The initial modulus (G_i) is estimated by aligning a ruler with the initial linear portion of the J expansion curve. The modulus is then estimated using the following expression: -

$G_i = ½*(d\rho / d\varepsilon_c)$

where:- $d\rho$ - change in applied stress
$d\varepsilon_c$ - change in cavity strain

The initial modulus is not normally used for design as it is sensitive to disturbance caused by the drilling process and is not as repeatable or reliable as a modulus derived from an unload-reload loop. The initial modulus is presented on the Marsland and Randolph plot.

A similar procedure is carried out to estimate the modulus from an unload-reload loop. Some hysteresis may present and the ruler is positioned as a best fit line through the loop.
The expression used for G_i is modified as shown below to allow for the strain level at which the loop is performed.

$G_{ur} = ½*(\rho / \rho_o)*(d\rho / d\varepsilon_c)$

where:- ρ - current radius of cavity
ρ_o - initial radius of cavity

A typical plot for an unload-reload loop is shown in Figure C. The calculated G_{ur} value (denoted as Gr on the plot) is displayed in the top left corner, together with values of pressure and strain ranges and mean pressure and strain. Calculated modulus values are influenced by the amplitude of the loop and the strain level. This should be borne in mind when assessing the modulus values.

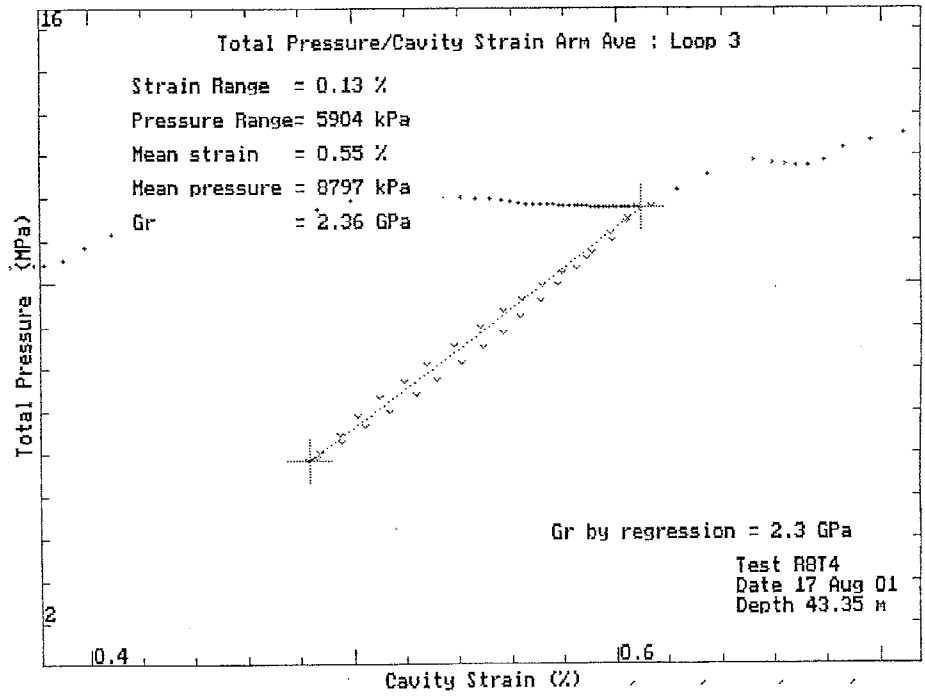


Figure C: Estimation of Unload-Reload Modulus

A regression analysis of the points identified as being on the loop is also carried out. The calculated modulus is presented in the bottom right corner of the plot. It is recommended

that greater reliance is placed on the modulus obtained using the ruler as the regression analysis may be influenced by the distribution of the points on the loop.

The calculation of the modulus is based on the assumption that the rock forms a continuous medium around the cavity. This assumption may be incorrect as joints or fissures may be present adjacent to the cavity. Alternatively tensile fissuring may occur if the circumferential tensile stress around the cavity exceeds the tensile strength of the rock. This has been considered by Rocha et al (1966) and Haberfield and Johnston (1990). Haberfield and Johnston suggest that a pressuremeter which measures displacement volumetrically will be preferable as this will provide an average reading and reduce the influence of fissures. This suggestion does not consider end effects due to the finite length of the expanding section. The problem is overcome by considering an average of all six strain arms of the HPD, which measure displacement at the centre of the expanding section, and conditions approaching plane strain apply.

5.4 Shear Strength

The normal method for calculation of undrained shear strength in a rock is the Gibson and Anderson (1961) analysis. This analysis assumes undrained expansion and that the rock behaves as an elastic perfectly plastic medium with no volume change occurring during expansion. This may not be the case in a rock and Gibson and Anderson (1961) showed that it was possible to estimate the undrained shear strength (S_u) by plotting the applied pressure against loge(volumetric strain). The slope of the linear portion of this graph is equal to the undrained shear strength. A typical plot is shown in Figure D. The shear strength is determined by aligning a ruler with the linear portion of the curve.

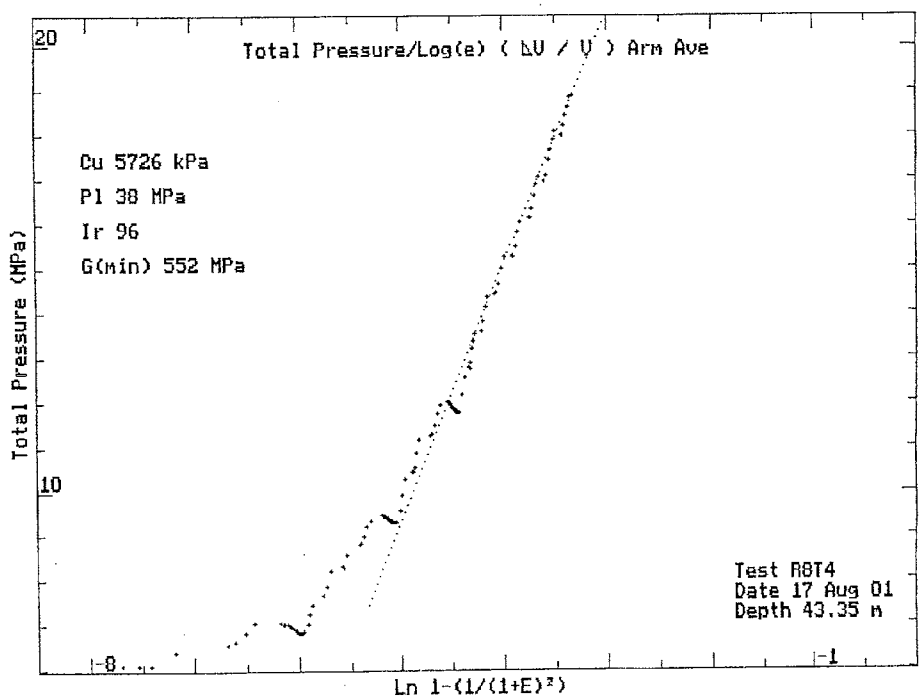


Figure D: Estimation of Undrained Shear Strength By Gibson and Anderson

This plot also presents an estimate of the limit pressure (P_L). This is defined as the pressure at which change in volume/current volume equals one ($\Delta V/V = 1$). This cannot be obtained

in a real test and is calculated by extrapolation. It should be noted that this definition of limit pressure is different to the Menard limit pressure in (P_{LM}) which is defined as $\Delta V/V = 0.5$.
Also included on this plot are calculated values for shear modulus (G(min)) and rigidity index (I_r). G(min) is calculated using the Gibson and Anderson equation:-

$$P_L = \sigma_{ho} + S_u [1 + \log_e(G/S_u)]$$

G(min) represents a large strain shear modulus and therefore provides a lower bound value for comparison with modulus values determined from unload-reload loops. I_r is calculated using the computed values for G(min) and S_u as follows:-

$$I_r = G(min)/S_u$$

ENCLOSURE D

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX1
Particle Size Distribution Analyses	PSD1 to 13
California Bearing Ratio Test Results	CBR 1 and 2
Unconsolidated Undrained Triaxial Compression Tests – Summary of Results	UUSUM 1
Index Properties of Rock – Summary of Results	RINDX 1
Point Load Index Test Results	PLT1 to 11
Uniaxial Compressive Strength Test Results	RUCS1 and 2

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	ρ Mg/m^3	ρ_d Mg/m^3	w %	< 425 µm sieve %	W_L %	W_P %	I_P	ρ_s Mg/m^3	Remarks
BH201	5	2.50	2.95	D	Brown slightly sandy gravelly CLAY.			11	54 s	31 b	19	12		
BH206	5	2.00	3.00	B	Brown slightly sandy gravelly CLAY.			15	48 s	32 a	18	14		
BH209	3	1.80	1.80	D	Grey and black slightly sandy slightly gravelly CLAY.			20	90 s	43 a	22	21		
BH210	3	1.00	2.00	B	Brownish grey slightly sandy slightly gravelly CLAY.			21	74 s	42 a	24	18		
BH210	8	4.00	4.45	D	Grey and brown slightly sandy slightly gravelly CLAY. Gravel is mudstone.			13	90 s	44 b	24	20		
BH212	3	1.20	2.00	B	Brown sandy slightly CLAY.			15	56 s	28 a	18	10		
BH212	10	5.50	6.50	B	Brown slightly sandy slightly gravelly CLAY.			18	62 s	35 a	19	16		
BH213	1	0.00	1.20	B	Brown slightly sandy slightly gravelly CLAY with some cobbles.			19	61 s	43 a	21	22		
BH214	3	1.20	3.00	B	Brown and grey slightly sandy slightly gravelly CLAY.			14	63 s	33 a	18	15		
BH214	8	4.00	4.90	B	Grey and brown slightly sandy slightly gravelly CLAY.			17	60 s	37 a	18	19		
BH215	5	2.00	3.00	B	Brown and grey slightly sandy slightly gravelly CLAY.			22	91 s	53 a	24	29		
BH215	9	4.60		D	Brownish grey slightly sandy slightly gravelly CLAY. Gravel is very weak mudstone.			22	100 n	34 a	20	14		
BH216	6	2.00	3.00	B	Greyish brown slightly sandy slightly gravelly CLAY.			14	77 s	37 a	19	18		
BH216	14	5.60	5.70	D	Brown slightly sandy slightly gravelly CLAY with mudstone.			12	67 s	35 b	22	13		
BH219	6	2.00	3.00	B	Brown slightly sandy slightly gravelly CLAY.			15	62 s	36 a	19	17		
BH219	15	7.40	7.49	D	Brown slightly sandy slightly CLAY.			8.7	52 s	37 b	21	16		

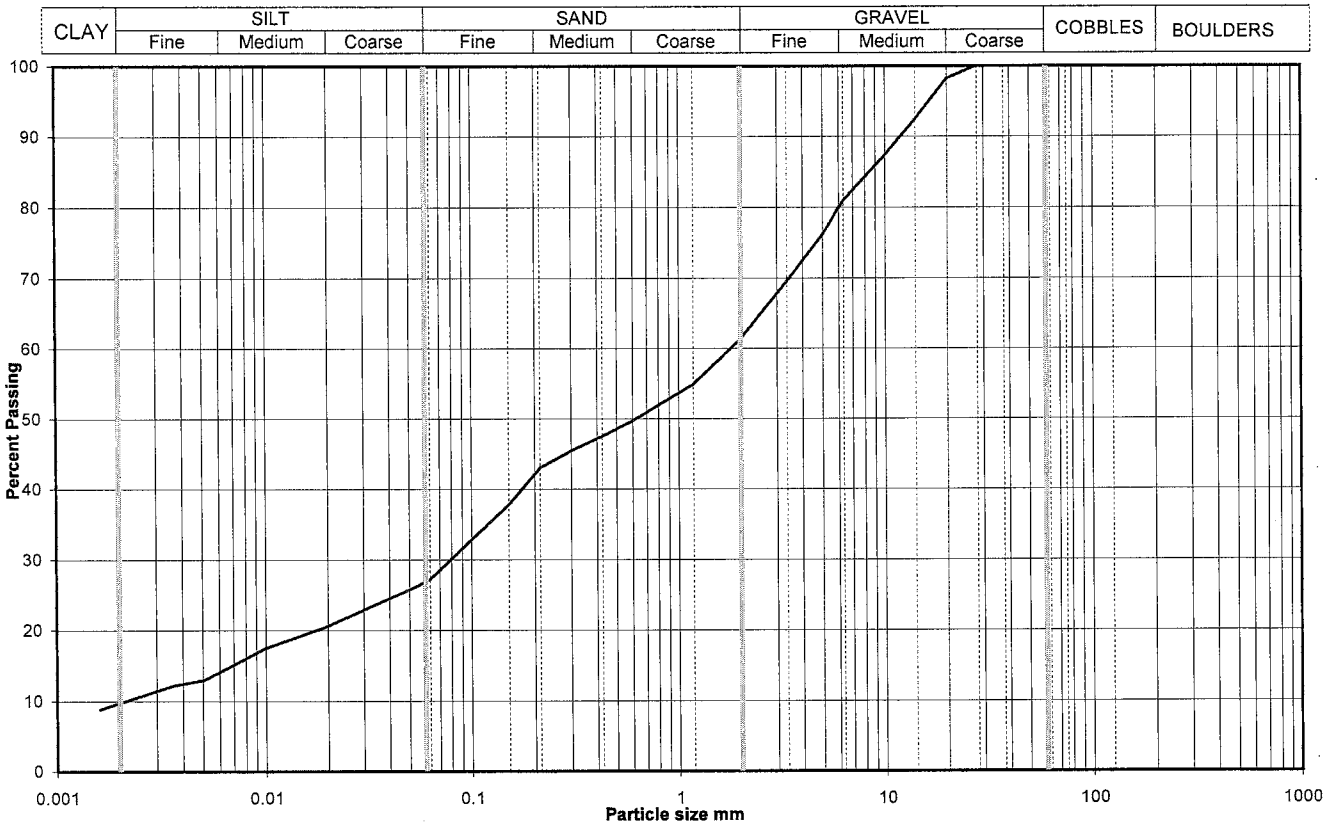
General notes: All above tests carried out to BS1377 : 1990 definitive method in all cases unless annotated otherwise. See individual test reports for further details.

Key :

ρ	bulk density, linear	W_L Liquid limit	W_P	Plastic limit	<425um preparation	ρ_s	particle density
ρ_d	dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g	= gas jar
w	moisture content	b 1 point cone test	I_P	Plasticity Index	s sieved specimen	-p	= small pyknometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH206		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	2.00		
			Samp No	5	Type	B
			ID	ESGA80172008031200000000163		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	27
90	100	0.0514	26
75	100	0.0368	24
63	100	0.0263	22
50	100	0.0188	20
37.5	100	0.0099	17
28	100	0.0051	13
20	98	0.0036	12
14	92	0.0016	9
10	87		
6.3	81		
5.0	76		
3.35	70		
2.00	61		
1.18	55	Particle density, Mg/m3	
0.600	50	2.65 assumed	
0.425	48		
0.300	45	Dry mass of sample, kg	
0.212	43		
0.150	38	5.5	
0.063	27		

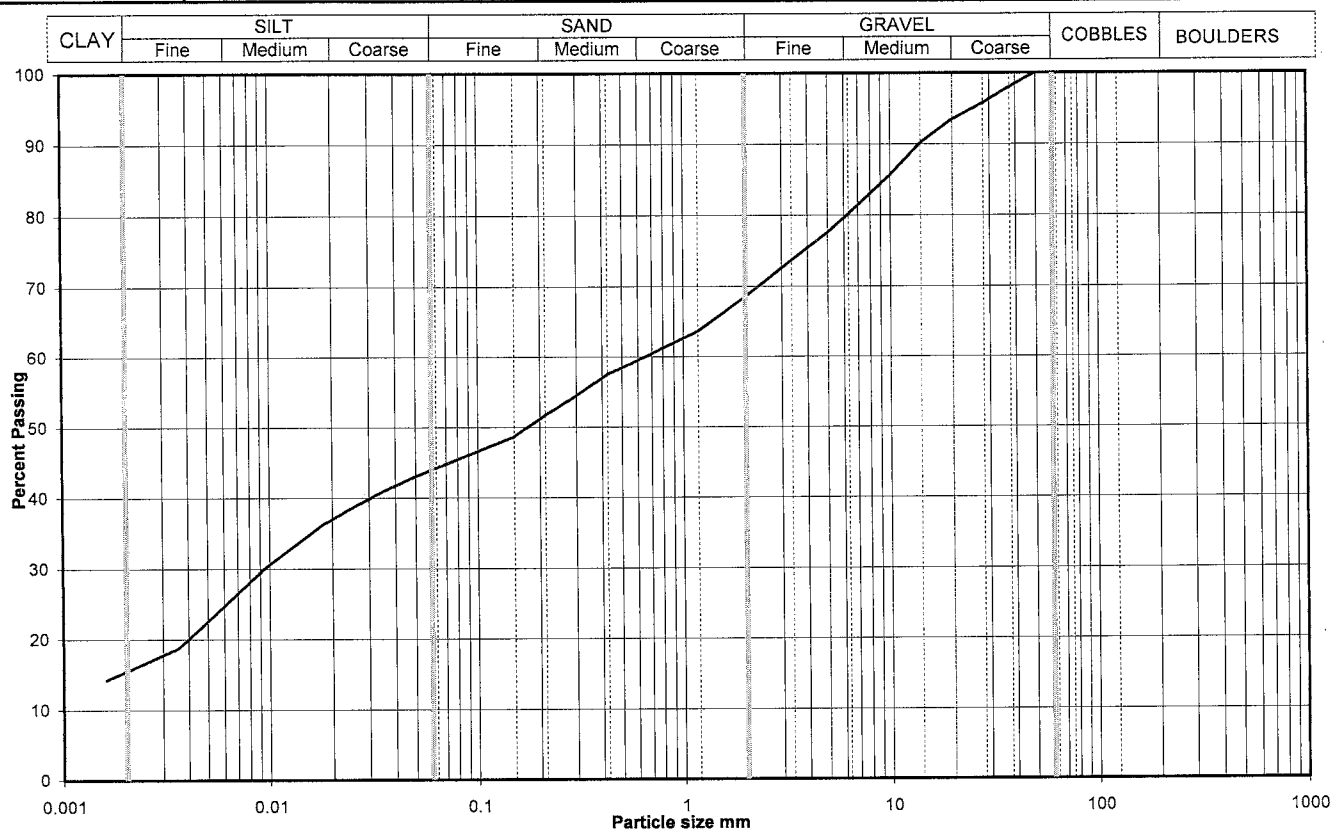
Soil description	Brown slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	39	39
	Sand	34	34
	Silt	17	17
	Clay	10	10

Uniformity Coefficient	D_{60} / D_{10}	842

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH207		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	1.00		
			Samp No	2	Type	B
			ID	ESGA801720080312000000172		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	44
90	100	0.0494	43
75	100	0.0353	41
63	100	0.0253	39
50	100	0.0181	36
37.5	98	0.0096	30
28	96	0.0050	22
20	93	0.0036	19
14	90	0.0016	14
10	86		
6.3	80		
5.0	78		
3.35	74		
2.00	68		
1.18	64	Particle density, Mg/m3	
0.600	59	2.65 assumed	
0.425	57	Dry mass of sample, kg	
0.300	54	11.9	
0.212	52		
0.150	49		
0.063	44		

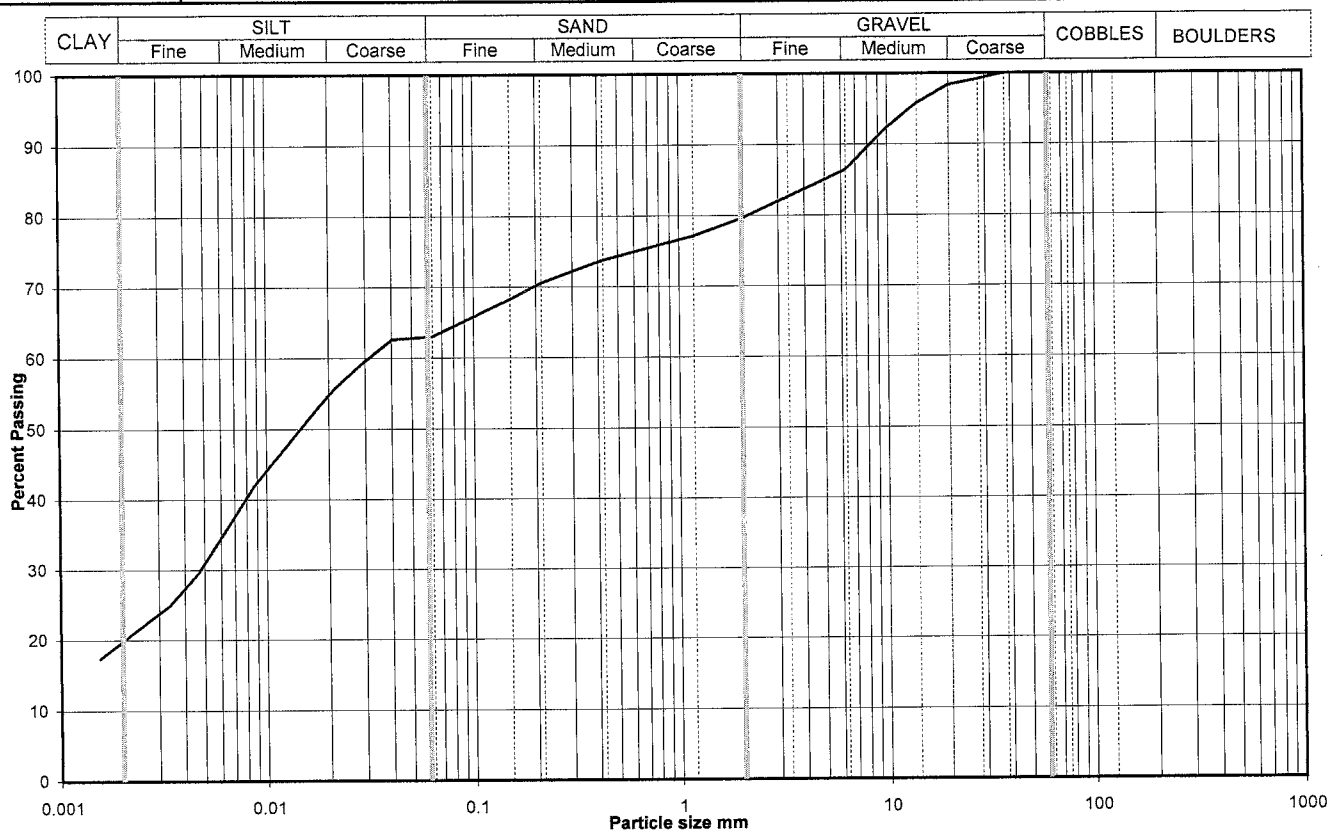
Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	32	32
	Sand	25	25
	Silt	28	28
	Clay	15	15

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH210		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	1.00		
			Samp No	3	Type	B
			ID	ESGA801720080312000000193		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	63
90	100	0.0405	63
75	100	0.0295	59
63	100	0.0215	56
50	100	0.0158	51
37.5	100	0.0087	42
28	99	0.0047	30
20	98	0.0034	25
14	96	0.0015	17
10	92		
6.3	86		
5.0	85		
3.35	83		
2.00	80		
1.18	77	Particle density, Mg/m3	
0.600	75	2.65 assumed	
0.425	74		
0.300	72	Dry mass of sample, kg	
0.212	71	4.4	
0.150	68		
0.063	63		

Soil description	Brownish grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	20	20
	Sand	17	17
	Silt	43	43
	Clay	20	20

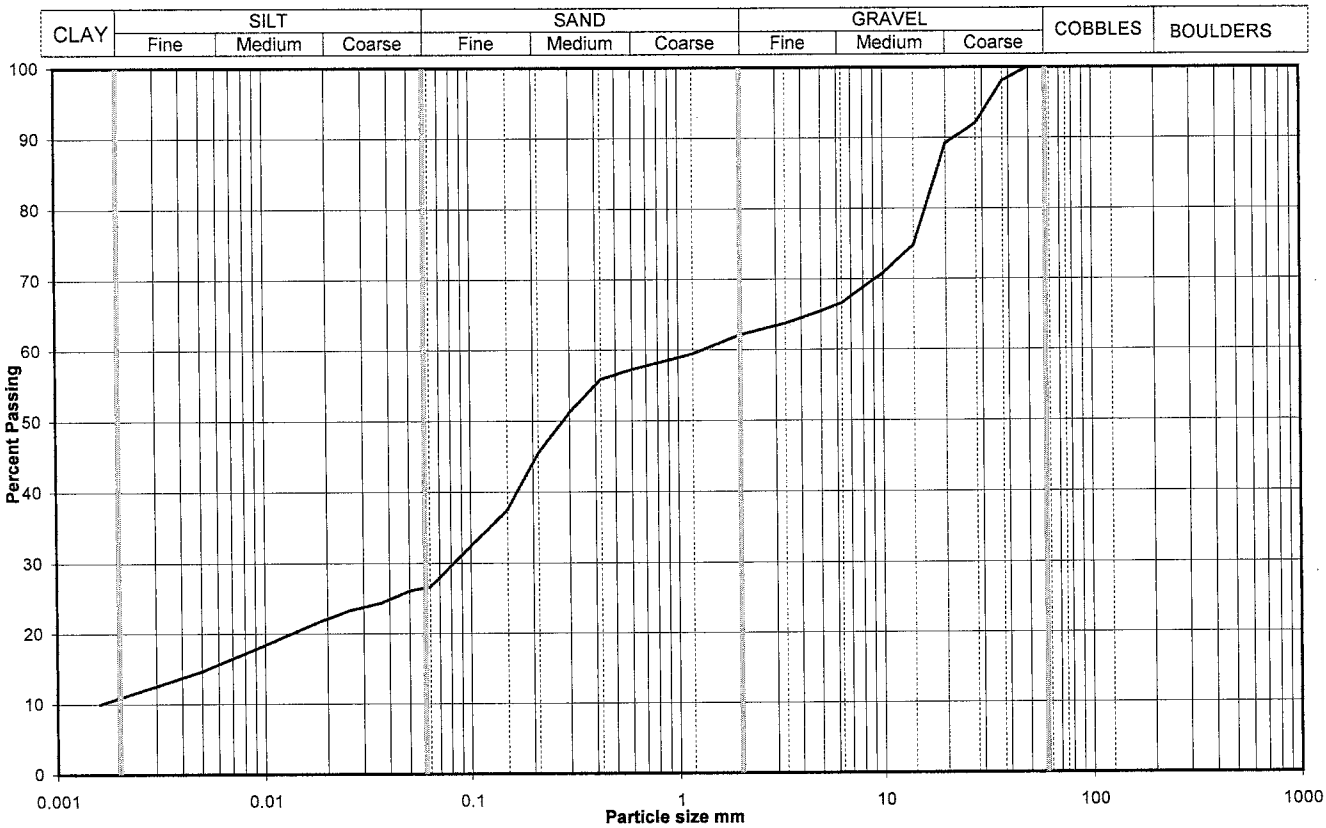
Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2.9 Rev 78 Jan 08	Soil Mechanics	UKAS TESTING 1157	Printed:14/04/2008 13:30	**Figure** **PSD 3**

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH212		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	1.20		
			Samp No	3	Type	B
			ID	ESGA80172008031100000000018		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	27
90	100	0.0508	26
75	100	0.0364	24
63	100	0.0259	23
50	100	0.0185	22
37.5	98	0.0098	18
28	92	0.0050	15
20	89	0.0036	13
14	75	0.0016	10
10	71		
6.3	67		
5.0	65		
3.35	64		
2.00	62		
1.18	59	Particle density, Mg/m3	
0.600	57		
0.425	56	2.65 assumed	
0.300	51	Dry mass of sample, kg	
0.212	45		
0.150	37	10.9	
0.063	27		

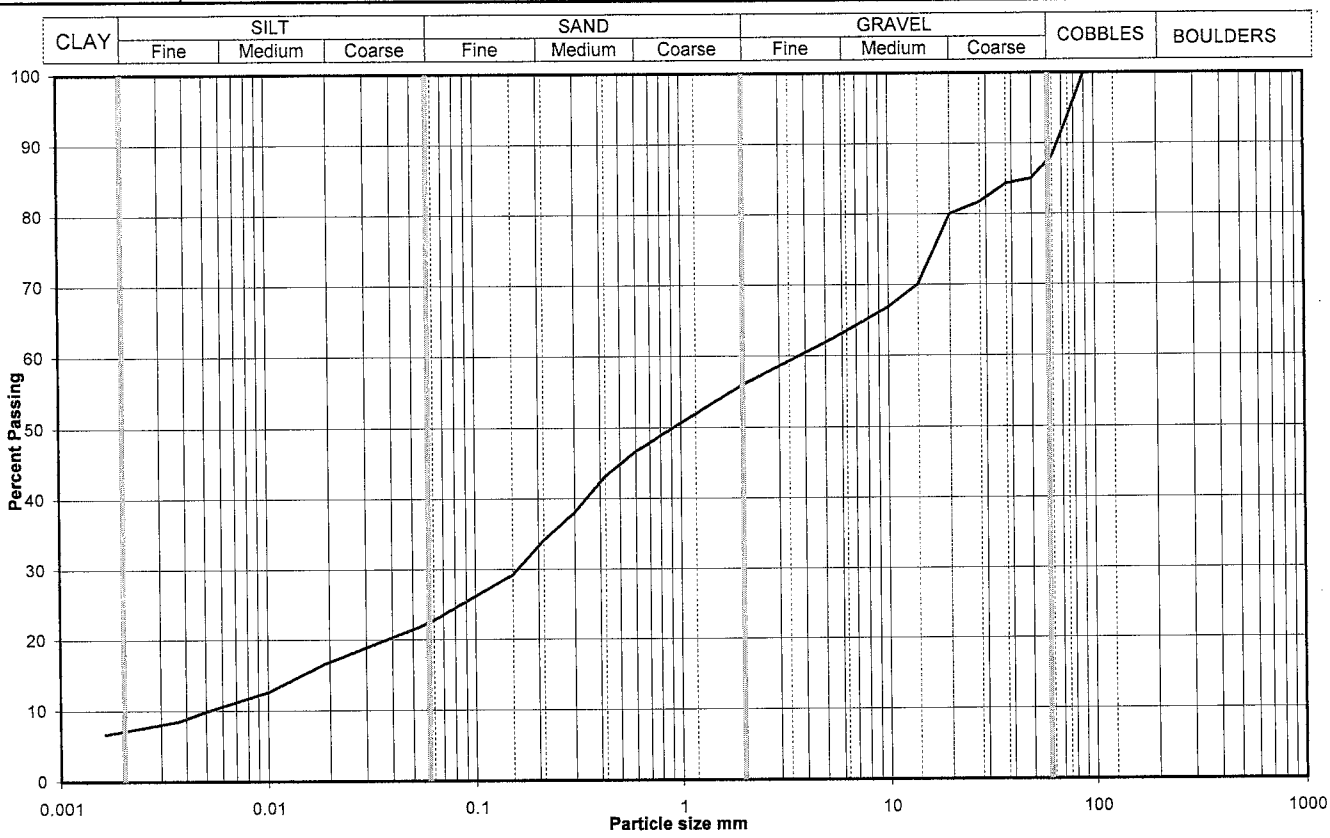
Soil description	Brown sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	38	38
	Sand	36	36
	Silt	15	15
	Clay	11	11

Uniformity Coefficient	D_{60} / D_{10}	813

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH212		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	2.00		
			Samp No	4	Type	B
			ID	ESGA80172008031100000000020		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	23
90	100	0.0520	22
75	94	0.0372	20
63	88	0.0266	18
50	85	0.0190	17
37.5	84	0.0101	13
28	82	0.0051	10
20	80	0.0037	8
14	70	0.0016	7
10	67		
6.3	63		
5.0	62		
3.35	59		
2.00	56		
1.18	52	Particle density, Mg/m3	
0.600	47	2.65 assumed	
0.425	43	Dry mass of sample, kg	
0.300	38	8.7	
0.212	34		
0.150	29		
0.063	23		

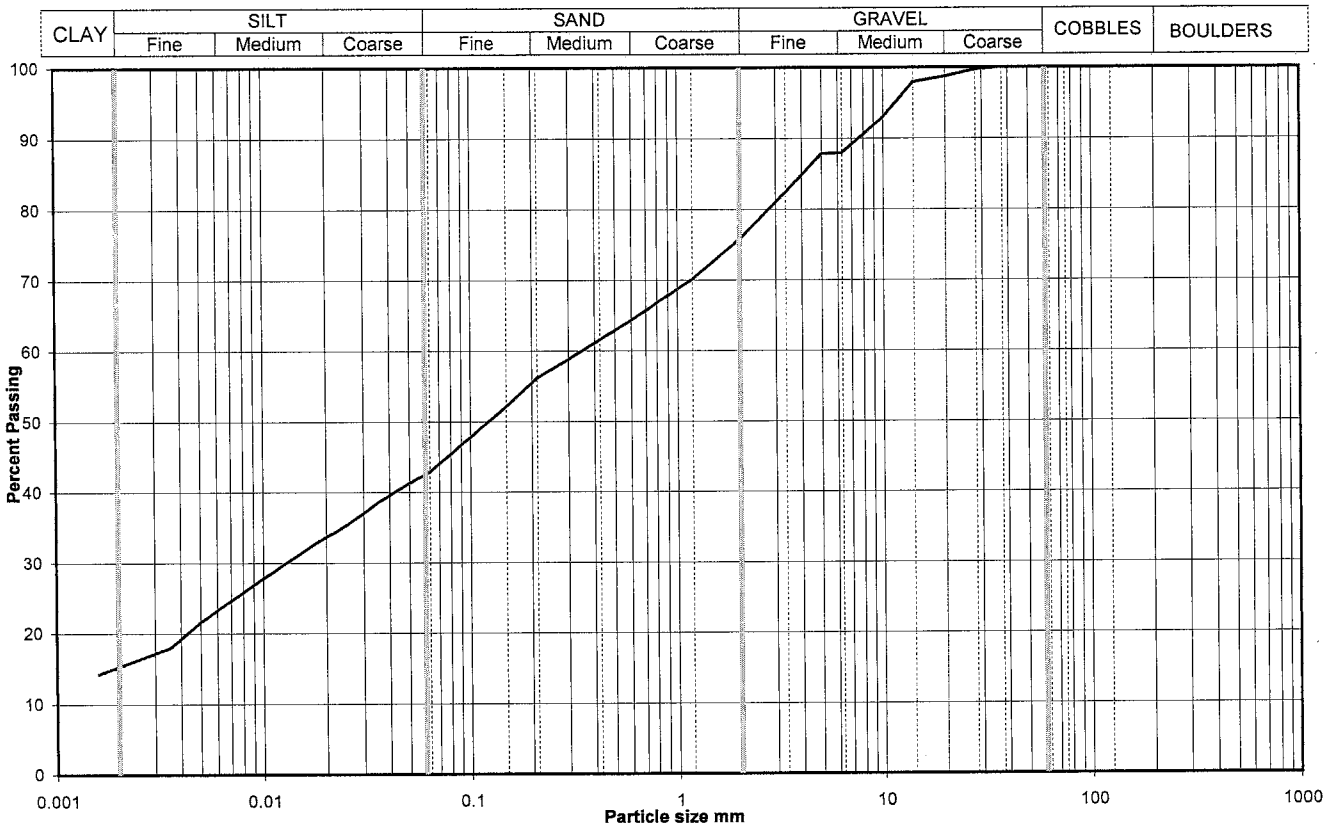
Soil description	Dark brown slightly sandy slightly gravelly CLAY/SILT with some cobbles.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	13	0
	Gravel	31	36
	Sand	33	38
	Silt	16	18
	Clay	7	8

Uniformity Coefficient	D_{60} / D_{10}	722

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH212		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	5.50		
			Samp No	10	Type	B
			ID	ESGA80172008031100000000028		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	43
90	100	0.0493	41
75	100	0.0354	39
63	100	0.0254	36
50	100	0.0182	33
37.5	100	0.0097	27
28	100	0.0050	22
20	99	0.0036	18
14	98	0.0016	14
10	93		
6.3	88		
5.0	88		
3.35	82		
2.00	76		
1.18	70	Particle density, Mg/m3	
0.600	64		
0.425	62	2.65 assumed	
0.300	59	Dry mass of sample, kg	
0.212	56		
0.150	52	10.6	
0.063	43		

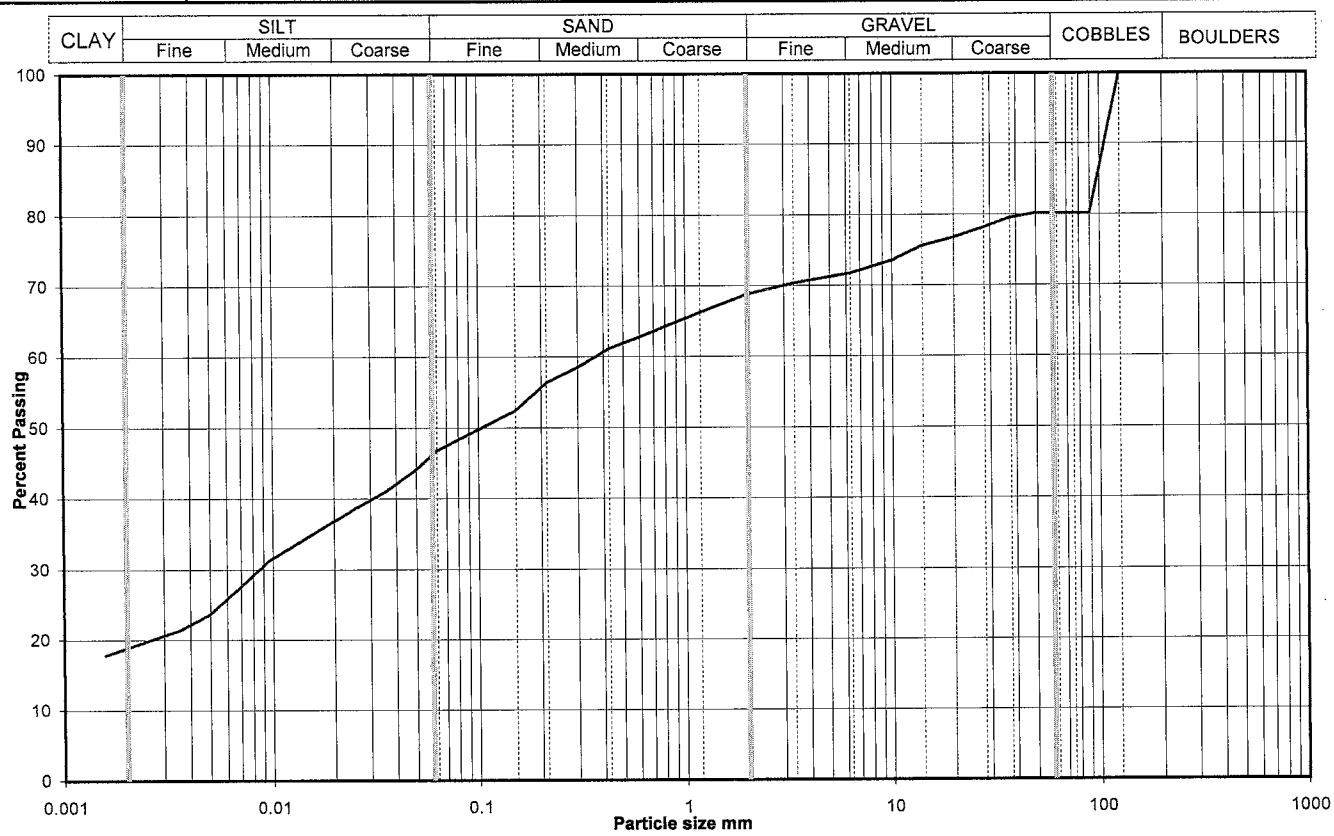
Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	24	24
	Sand	33	33
	Silt	27	27
	Clay	16	16

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH213		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	0.00		
			Samp No	1	Type	B
			ID	ESGA80172008031100000000030		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	47
90	80	0.0494	44
75	80	0.0354	41
63	80	0.0253	39
50	80	0.0181	36
37.5	79	0.0096	31
28	78	0.0050	24
20	77	0.0035	21
14	76	0.0016	18
10	73		
6.3	72		
5.0	71		
3.35	70		
2.00	69		
1.18	66	Particle density, Mg/m3	
0.600	63	2.65 assumed	
0.425	61		
0.300	58	Dry mass of sample, kg	
0.212	56		
0.150	52	8.1	
0.063	47		

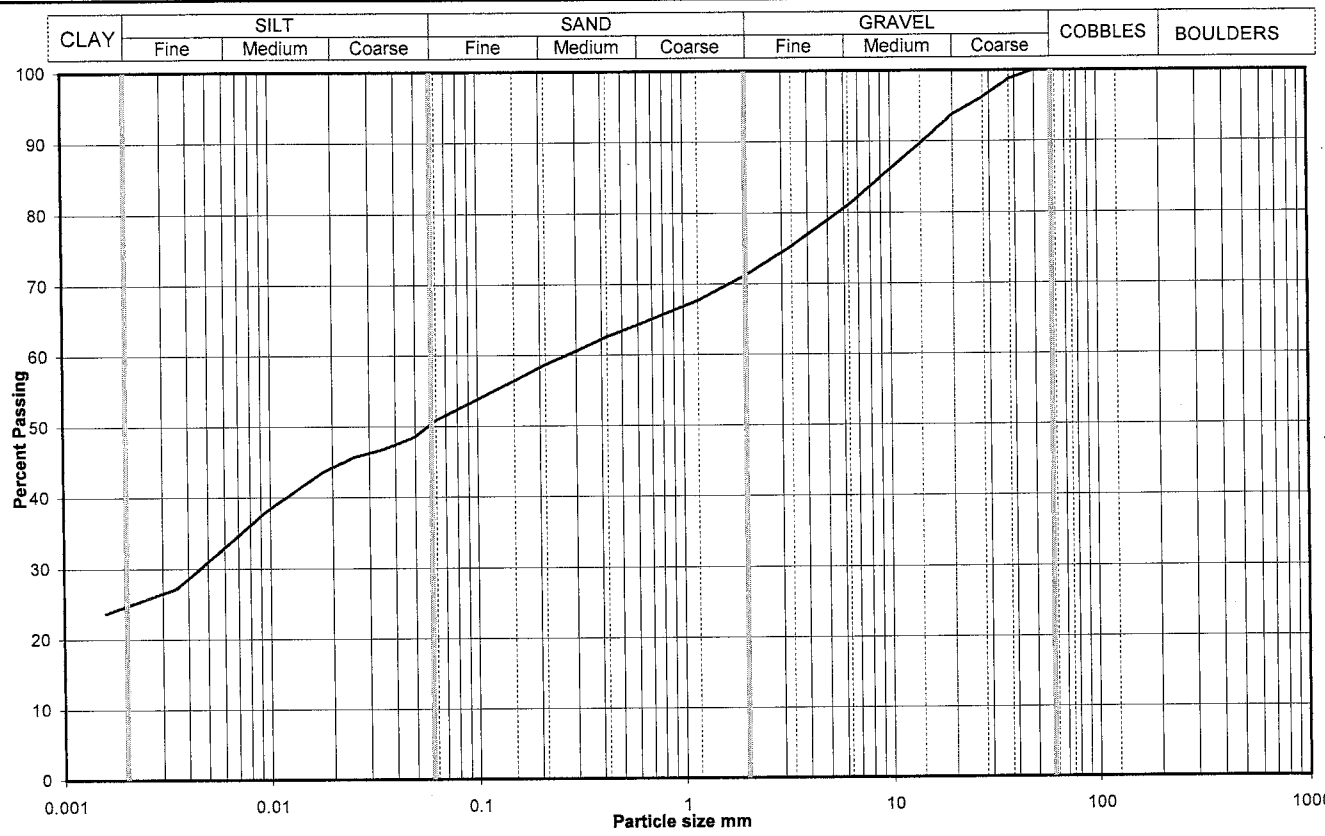
Soil description	Brown slightly sandy slightly gravelly CLAY with some cobbles.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	20	0
	Gravel	11	14
	Sand	23	29
	Silt	27	34
	Clay	19	24

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH214		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	1.20		
			Samp No	3	Type	B
			ID	ESGA80172008031100000000036		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	51
90	100	0.0498	49
75	100	0.0355	47
63	100	0.0252	46
50	100	0.0180	44
37.5	99	0.0095	38
28	96	0.0049	31
20	94	0.0035	27
14	90	0.0016	24
10	86		
6.3	81		
5.0	79		
3.35	75		
2.00	71		
1.18	68	Particle density, Mg/m3	
0.600	64	2.65	assumed
0.425	63	Dry mass of sample, kg	
0.300	61	8.6	
0.212	59		
0.150	56		
0.063	51		

Soil description	Brown and grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	29	29
	Sand	21	21
	Silt	25	25
	Clay	25	25

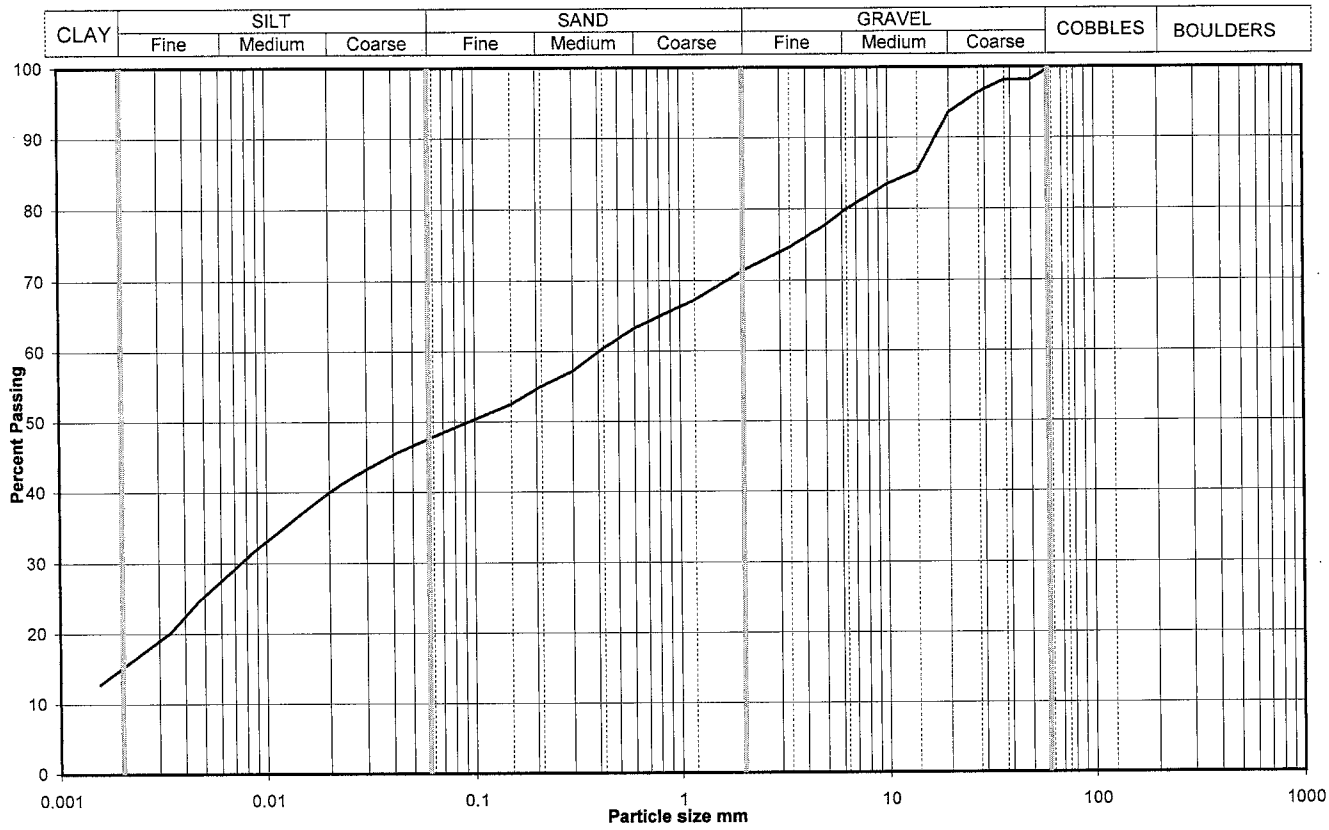
Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH214		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	4.00		
			Samp No	8	Type	B
			ID	ESGA80172008031100000000041		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	48
90	100	0.0418	46
75	100	0.0303	43
63	100	0.0220	41
50	98	0.0160	38
37.5	98	0.0087	32
28	96	0.0046	25
20	94	0.0034	20
14	85	0.0015	13
10	83		
6.3	80		
5.0	78		
3.35	75		
2.00	71		
1.18	67	Particle density, Mg/m3	
0.600	63	2.65 assumed	
0.425	60	Dry mass of sample, kg	
0.300	57	8.5	
0.212	55		
0.150	52		
0.063	48		

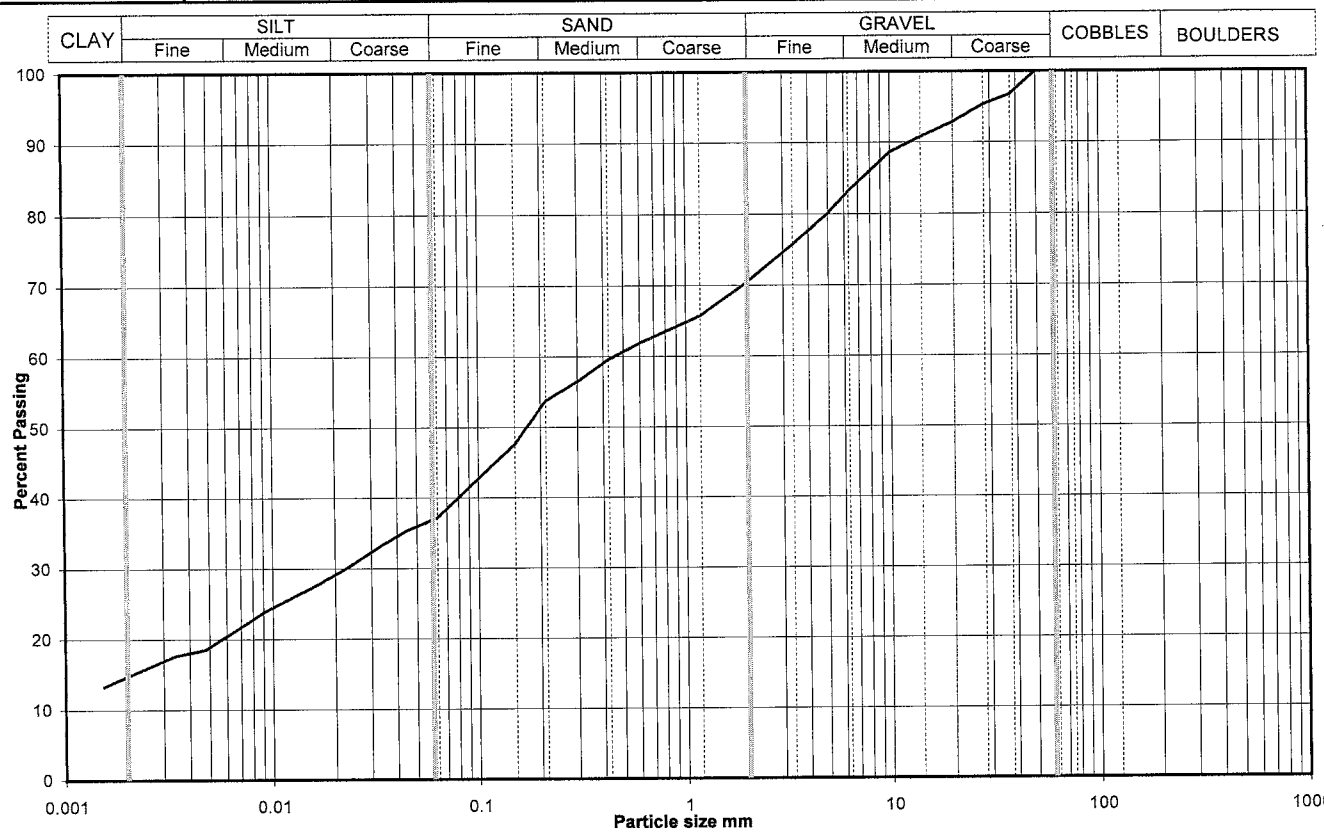
Soil description	Grey and brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	29	29
	Sand	24	24
	Silt	32	32
	Clay	15	15

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH215		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	1.20		
			Samp No	3	Type	B
			ID	ESGA801720080312000000123		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	37
90	100	0.0449	35
75	100	0.0326	33
63	100	0.0236	30
50	100	0.0171	28
37.5	97	0.0091	24
28	95	0.0048	18
20	93	0.0034	18
14	91	0.0015	13
10	89		
6.3	83		
5.0	80		
3.35	76		
2.00	70		
1.18	66	Particle density, Mg/m3	
0.600	62	2.65 assumed	
0.425	60	Dry mass of sample, kg	
0.300	56		
0.212	54	9.9	
0.150	48		
0.063	37		

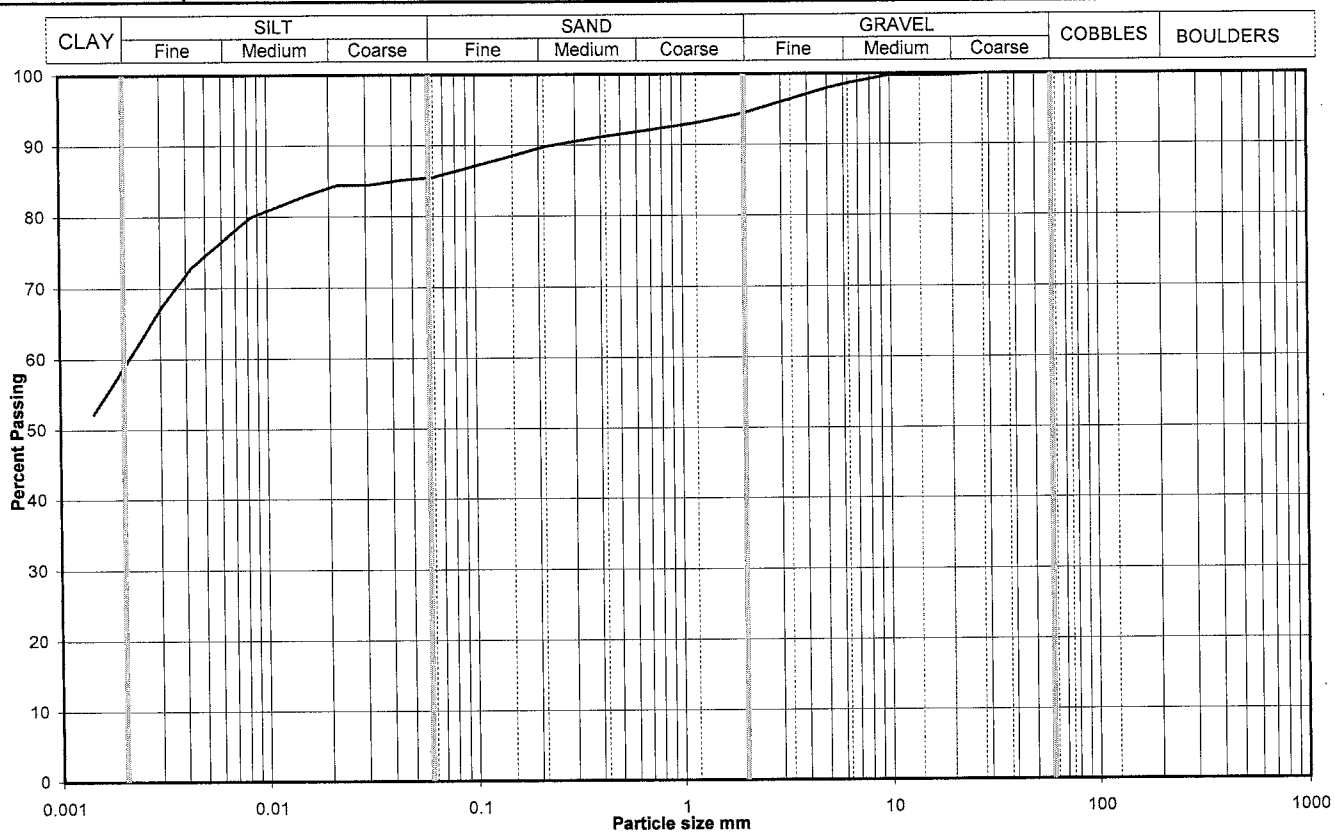
Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	30	30
	Sand	33	33
	Silt	22	22
	Clay	15	15

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH215		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	2.00		
			Samp No	5	Type	B
			ID	ESGA801720080312000000126		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	85
90	100	0.0445	85
75	100	0.0316	84
63	100	0.0223	84
50	100	0.0159	83
37.5	100	0.0083	80
28	100	0.0043	73
20	100	0.0031	68
14	100	0.0014	52
10	100		
6.3	99		
5.0	98		
3.35	96		
2.00	94		
1.18	93		
0.600	92		
0.425	91		
0.300	90		
0.212	90		
0.150	88		
0.063	85		

Particle density, Mg/m3

2.65 assumed

Dry mass of sample, kg

7.5

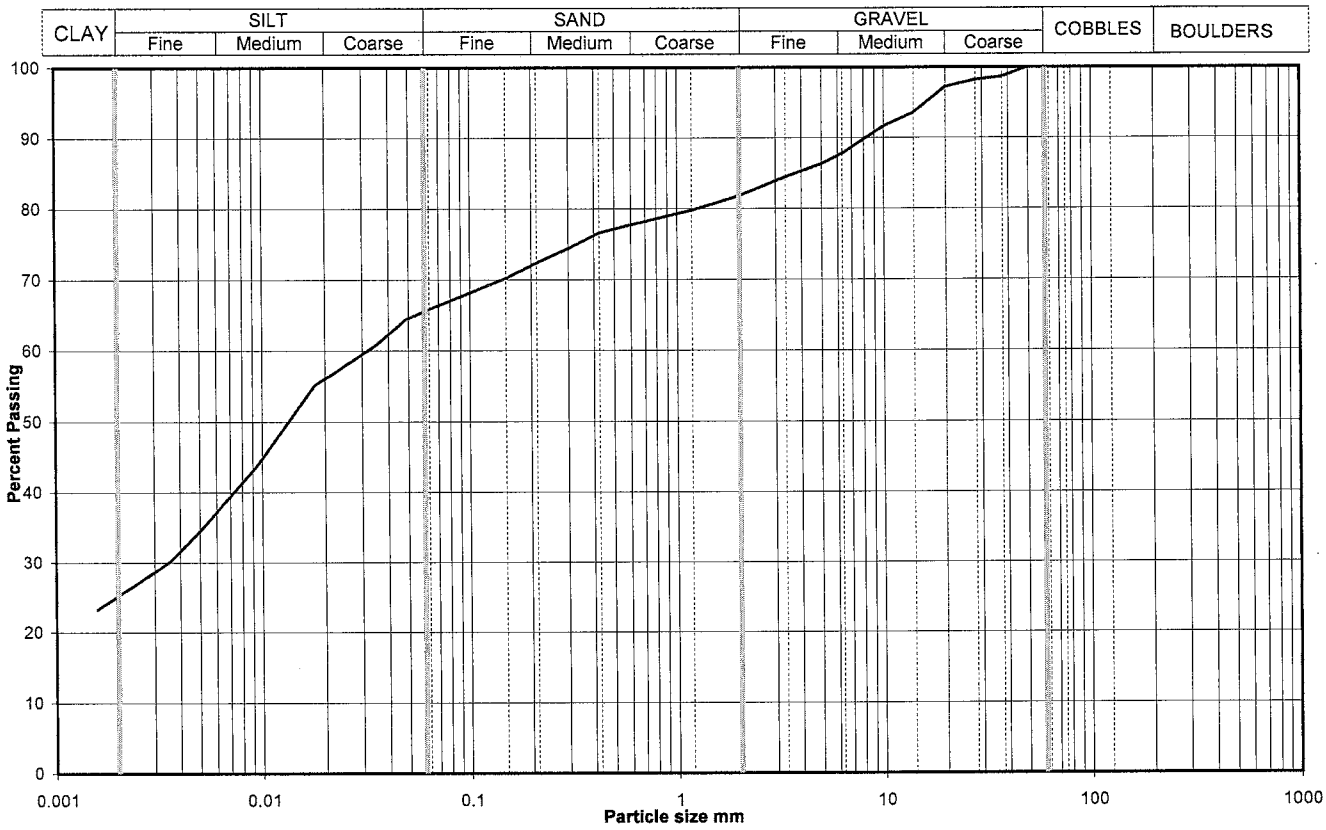
Soil description	Brown and grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	6	6
	Sand	9	9
	Silt	26	26
	Clay	59	59

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH216		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	2.00		
			Samp No	6	Type	B
			ID	ESGA80172008031200000000207		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	66
90	100	0.0489	64
75	100	0.0350	61
63	100	0.0250	58
50	100	0.0179	55
37.5	99	0.0096	44
28	98	0.0049	34
20	97	0.0035	30
14	94	0.0016	23
10	92		
6.3	88		
5.0	86		
3.35	84		
2.00	82		
1.18	80	Particle density, Mg/m3	
0.600	78	2.65 assumed	
0.425	77		
0.300	74	Dry mass of sample, kg	
0.212	72		
0.150	70	9.2	
0.063	66		

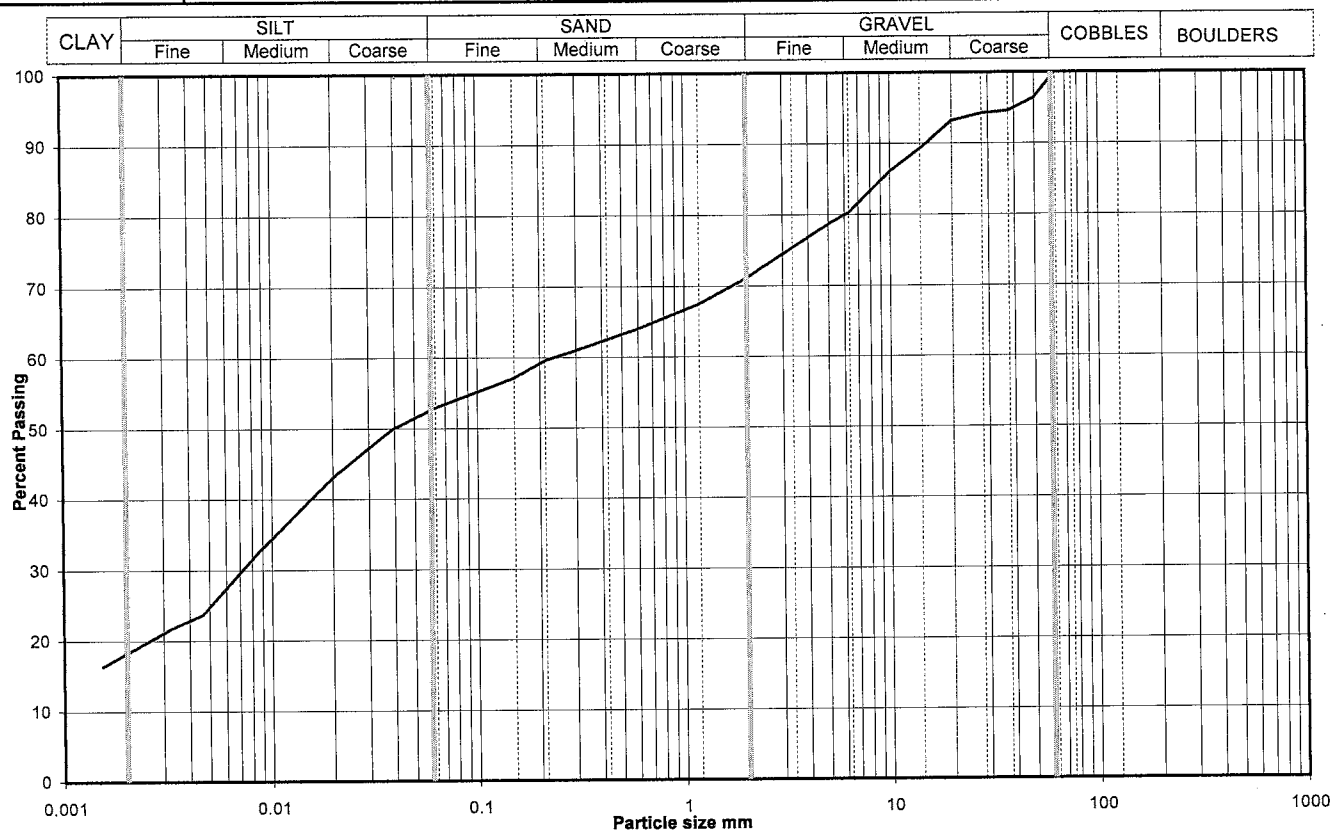
Soil description	Greyish brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	18	18
	Sand	16	16
	Silt	41	41
	Clay	25	25

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	A8017	Sample Details:	Hole No	BH219		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	2.00		
			Samp No	6	Type	B
			ID	ESGA80172008031200000000139		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	53
90	100	0.0388	50
75	100	0.0286	47
63	100	0.0210	44
50	96	0.0155	40
37.5	95	0.0086	33
28	94	0.0046	24
20	93	0.0033	22
14	89	0.0015	16
10	86		
6.3	80		
5.0	79		
3.35	75		
2.00	71		
1.18	67	Particle density, Mg/m3	
0.600	64	2.65 assumed	
0.425	62		
0.300	61	Dry mass of sample, kg	
0.212	60	6.7	
0.150	57		
0.063	53		

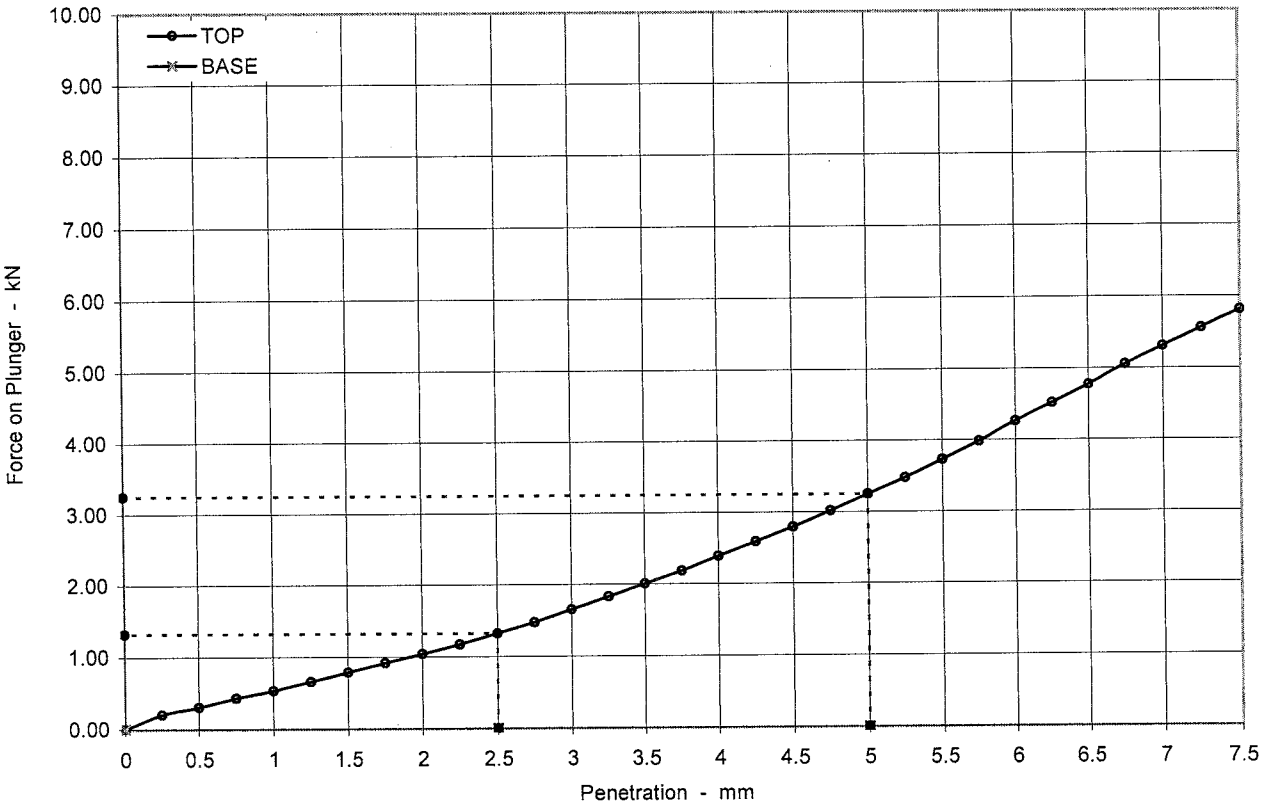
Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	1	0
	Gravel	28	28
	Sand	18	18
	Silt	35	35
	Clay	18	18

Uniformity Coefficient	D_{60} / D_{10}	#N/A

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

California Bearing Ratio (BS1377:1990:Part 4 , section 7)

Project No	A8017	Sample Details:	Hole No	TP276		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	0.10		
			Samp No	1	Type	B
			ID	ESGA80172008032600000000299		
			Spec Ref			



Soil description	Brown slightly silty slightly gravelly CLAY.

Test Conditions		
Sample Retained on 20 mm sieve	%	14

Preparation	Method of Compaction		
	Recompacted - Rammer compaction with specified effort (4.5kg)		
	Soaked test		NO
	Soaking Period	days	N/A
	Amount of Swell	mm	N/A

Surcharge applied	kg	16
	kPa	10

Notes :

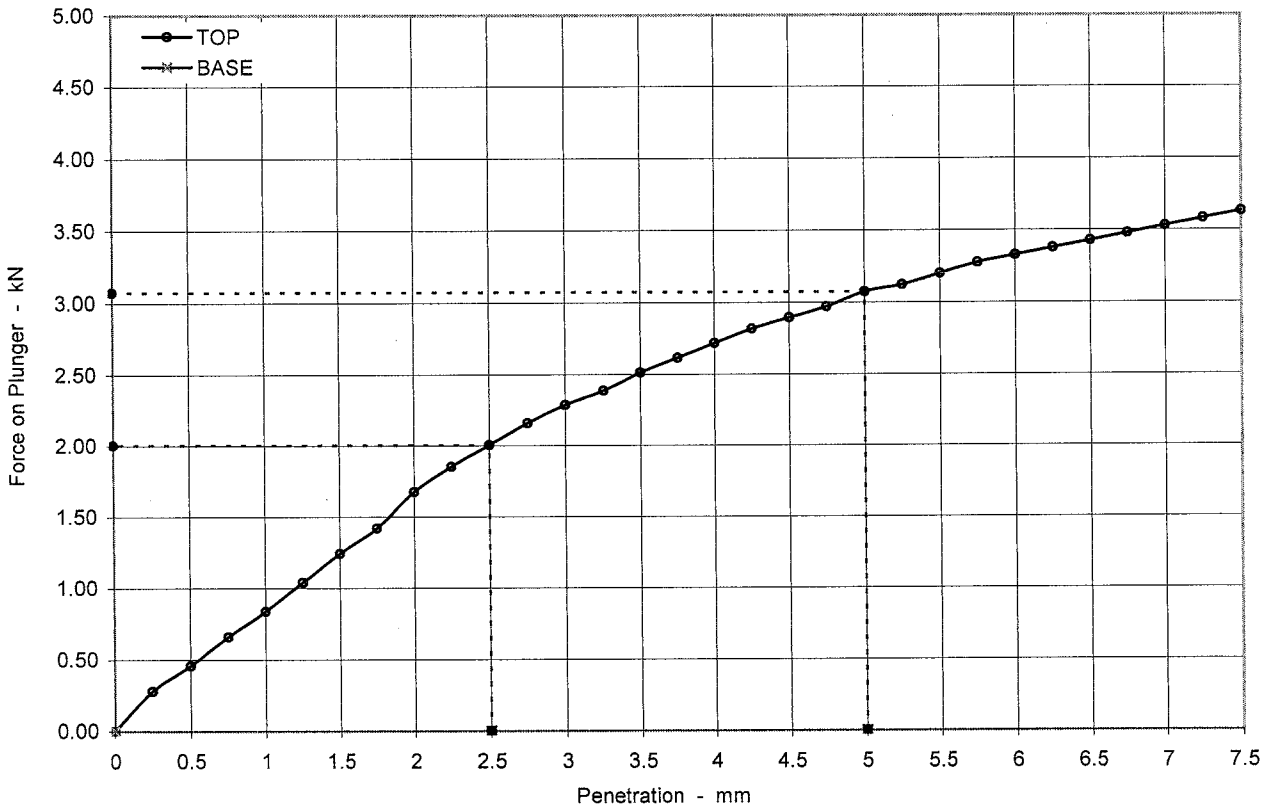
Sample Conditions		
Initial Moisture Content	%	13
Bulk Density	Mg/m³	2.28
Dry Density	Mg/m³	2.02
Moisture Content - TOP	%	12
Moisture Content - BASE	%	

Penetration mm	CBR Values %	
	TOP	BASE
2.5	10	-
5.0	16	-

Accepted CBR %	**16**	**-**

California Bearing Ratio (BS1377:1990:Part 4 , section 7)

Project No	A8017	Sample Details:	Hole No	TP280		
Project Name	BARNSLEY MARKET PHASE 2		Depth (m BGL)	0.40		
			Samp No	1	Type	B
			ID	ESGA80172008032600000000300		
			Spec Ref			



Soil description	Brown slightly gravelly CLAY.

Test Conditions		
Sample Retained on 20 mm sieve	%	4

Preparation	Method of Compaction		
	Recompacted - Rammer compaction with specified effort (4.5kg)		
	Soaked test		NO
	Soaking Period	days	N/A
	Amount of Swell	mm	N/A

Surcharge applied	kg	16
	kPa	10

Notes :

Sample Conditions		
Initial Moisture Content	%	15
Bulk Density	Mg/m³	2.22
Dry Density	Mg/m³	1.93
Moisture Content - TOP	%	15
Moisture Content - BASE	%	

Penetration mm	CBR Values %	
	TOP	BASE
2.5	15	-
5.0	15	-

Accepted CBR %	**15**	**-**

QA Ref SLR 4.7 Rev 85 Jul 07	Soil Mechanics	UKAS TESTING 1157	Printed:19/04/2008 06:59	**Figure** **CBR 2**

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m³	Density dry Mg/m³	w %	Test type	Dia. mm	σ_3 kPa	At failure / end of stage: Axial strain %	$\sigma_1 - \sigma_3$ kPa	c_u kPa	MODE	Remarks
BH214	4	2.00	2.45	U	Stiff brown slightly sandy slightly gravelly CLAY.	2.12	1.82	17	UUM	103.8	50	4.4	153	77		
										103.8	150	8.8	218	109	B	
										103.8	250	12.3	258	129		
BH215	6	3.00	3.45	U	Stiff greyish brown slightly sandy slightly gravelly CLAY with occasional coal bands at top.	2.05	1.72	19	UUM	102.6	75	2.9	103	51		
										102.6	150	5.4	144	72	P	
										102.6	225	19.6	250	125		
BH216	7	3.00	3.65	U	Very stiff greyish brown slightly sandy slightly gravelly CLAY.	2.09	1.78	18	UUM	102.6	75	6.4	260	130		
										102.6	150	9.3	305	153	B	
										102.6	225	13.8	359	179		
BH219	7	3.00	3.45	U	Hard greyish brown slightly sandy slightly gravelly CLAY.	2.16	1.86	16	UUM	102.0	75	3.5	294	147		
										102.0	175	5.0	368	184	P	
										102.0	275	20.0	601	300		

General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested at a rate of strain of 2%/minute, unless annotated otherwise. See individual test reports for further details.

Legend

UU - single stage test (may be in sets of specimens)	σ_3	cell pressure	Mode of failure	P	plastic
UUM - multistage test on a single specimen	$\sigma_1 - \sigma_3$	deviator stress		B	brittle
suffix R - remoulded or recompacted	c_u	undrained shear strength		C	compound

INDEX PROPERTIES OF ROCK - SUMMARY OF RESULTS

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

Hole No.	Sample				Water Content[1]	Saturation and Caliper [2]		Saturation and Buoyancy [3]			Remarks
	No.	Depth (m) from	Depth (m) to	type	%	Dry density Mg/m^3	Porosity %	Dry density Mg/m^3	Porosity %		
BH207	18	18.73	19.05	CS	2.7	2.51					Sample collapsed on saturation, therefore density is by linear measurement and weighing, NOT saturation.
BH207	22	23.10	23.50	CS	3.7	2.44	4.6				

Notes : Test Specification : International Society for Rock Mechanics (ISRM), Rock Characterization Testing and Monitoring, Suggested Methods, 1981

1 ISRM p83 test 1, water content at 105 ± 3 °C, specimen as received at the laboratory

2 ISRM p83 test 2, bulk volume obtained by caliper measurement, pore volume by water saturation, average of 3 results, individual results available on request

3 ISRM p84 test 3, bulk volume by buoyancy technique, pore volume by water saturation

above notes apply unless annotated otherwise in the remarks

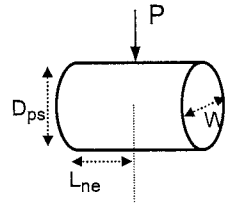
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

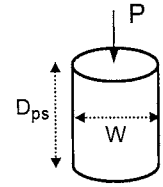
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Test Type
D - Diametral, A - Axial, I - Irregular Lump
Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
D_{ps}' - at failure
L_{ne} - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

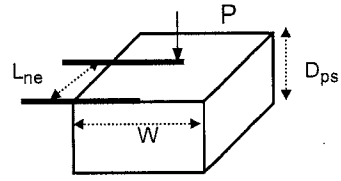
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH201	11.90 - 12.10	10	CS			MUDSTONE	D	U	Y	50	106	106	4.90	106	0.44	0.61	
BH201	11.90 - 12.10	10	CS	1		MUDSTONE	A	U	Y	50	37	106	4.80	70.6657	0.96	1.12	
BH201	12.17 - 12.29	11	CS			MUDSTONE	D	U	Y	50	105	105	2.10	105	0.19	0.27	
BH201	12.17 - 12.29	11	CS	1		MUDSTONE	A	U	Y	45	70	105	2.30	96.7384	0.25	0.33	
BH201	13.23 - 13.41	12	CS			MUDSTONE	D	U	Y	60	106	106	1.40	106	0.12	0.17	
BH201	13.23 - 13.41	12	CS	1		MUDSTONE	A	U	Y	48	59	106	3.70	89.2347	0.46	0.60	
BH201	24.27 - 24.52	15	CS			MUDSTONE	D	U	Y	55	85	85	3.60	85	0.50	0.63	
BH201	24.27 - 24.52	15	CS	1		MUDSTONE	A	U	Y	37	61	85	4.90	81.2511	0.74	0.92	
BH201	27.10 - 27.23	17	CS			MUDSTONE	D	U	Y	55	85	85	5.00	85	0.69	0.88	
BH201	27.10 - 27.23	17	CS	1		MUDSTONE	A	U	Y	37	59	85	8.00	79.908	1.25	1.55	
BH201	33.65 - 33.85	18	CS			MUDSTONE	D	U	Y	55	86	86	4.20	86	0.57	0.72	
BH201	33.65 - 33.85	18	CS	1		MUDSTONE	A	U	Y	35	69	86	5.20	86.9218	0.69	0.88	
BH201	37.43 - 37.57	20	CS			MUDSTONE	D	U	Y	50	78	78	4.00	78	0.66	0.80	
BH201	37.43 - 37.57	20	CS	1		MUDSTONE	A	U	Y	31	69	78	5.10	82.7803	0.74	0.93	
BH202	6.90 - 7.16	1	CS			MUDSTONE	D	U	Y	35	105	105	1.50	105	0.14	0.19	
BH202	6.90 - 7.16	1	CS	1		MUDSTONE	A	U	Y	47	83	105	2.20	105.339	0.20	0.28	
BH202	7.16 - 7.46	2	CS			MUDSTONE	D	U	Y	53	105	105	3.60	105	0.33	0.46	
BH202	7.16 - 7.46	2	CS	1		MUDSTONE	A	U	Y	49	54	105	6.00	84.9663	0.83	1.06	
BH202	8.70 - 8.80	3	CS			SILTSTONE	D	par	Y	52	60	60	1.40	60	0.39	0.42	Laminated
BH202	8.70 - 8.80	3	CS	1		SILTSTONE	A	per	Y	25	51	60	5.60	62.4189	1.44	1.59	Laminated

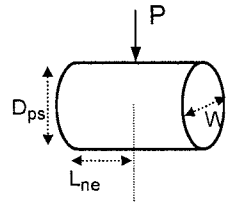
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

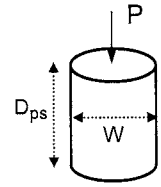
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Test Type
D - Diametral, A - Axial, I - Irregular Lump
Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
D_{ps}' - at failure
L_{ne} - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

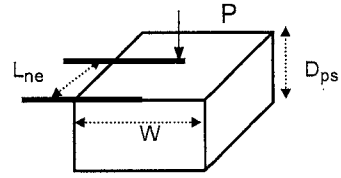
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH202	10.70 - 10.80	5	CS			MUDSTONE	D	U	Y	45	82	82	2.40	82	0.36	0.45	
BH202	10.70 - 10.80	5	CS	1		MUDSTONE	A	U	Y	35	54	82	2.60	75.086	0.46	0.55	
BH202	15.50 - 15.73	6	CS			MUDSTONE	D	U	Y	105	84	84	0.90	84	0.13	0.16	
BH202	15.50 - 15.73	6	CS	1		MUDSTONE	A	U	Y	35	65	84	0.80	83.378	0.12	0.14	
BH202	17.00 - 17.16	8	CS			MUDSTONE	D	U	Y	40	84	84	2.10	84	0.30	0.38	
BH202	17.00 - 17.16	8	CS	1		MUDSTONE	A	U	Y	35	44	84	1.90	68.5995	0.40	0.47	
BH202	19.66 - 19.80	9	CS			MUDSTONE	D	U	Y	55	86	86	4.70	86	0.64	0.81	
BH202	19.66 - 19.80	9	CS	1		MUDSTONE	A	U	Y	35	58	86	5.20	79.6927	0.82	1.01	
BH202	21.32 - 21.48	11	CS			MUDSTONE	D	U	Y	55	87	87	3.60	87	0.48	0.61	
BH202	21.32 - 21.48	11	CS	1		MUDSTONE	A	U	Y	37	67	87	4.60	86.1494	0.62	0.79	
BH202	24.00 - 24.13	13	CS			SILTSTONE	D	U	Y	50	87	87	12.00	87	1.59	2.03	
BH202	24.00 - 24.13	13	CS	1		SILTSTONE	A	U	Y	37	46	87	12.00	71.3828	2.36	2.76	
BH202	25.85 - 26.03	14	CS			SILTSTONE	D	par	Y	55	86	86	7.00	86	0.95	1.21	Contains partings.
BH202	25.85 - 26.03	14	CS	1		SILTSTONE	A	per	Y	37	53	86	15.00	76.1802	2.58	3.12	Contains partings.
BH202	29.10 - 29.30	16	CS			SILTSTONE	D	U	Y	45	87	87	10.00	87	1.32	1.70	
BH202	29.10 - 29.30	16	CS	1		SILTSTONE	A	U	Y	38	58	87	12.00	80.1546	1.87	2.31	
BH203	1.66 - 1.90	1	CS			MUDSTONE	D	U	Y	55	87	87	0.40	87	0.05	0.07	
BH203	1.66 - 1.90	1	CS	1		MUDSTONE	A	U	Y	37	47	87	0.20	72.1545	0.04	0.05	
BH203	2.37 - 2.50	2	CS			MUDSTONE	A	U	Y	37	52	87	3.10	75.8956	0.54	0.65	Fissured
BH203	3.30 - 3.40	3	CS			MUDSTONE	D	U	Y	50	85	85	0.20	85	0.03	0.04	Fissured

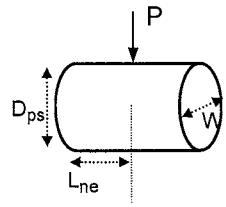
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

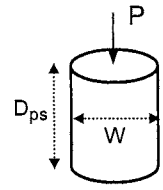
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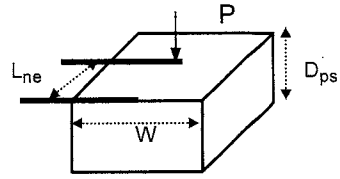
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH203	3.30 - 3.40	3	CS	1		MUDSTONE	A	U	Y	37	53	85	1.20	75.736	0.21	0.25	Fissured
BH203	5.52 - 5.66	5	CS			MUDSTONE	D	U	Y	70	81	81	2.10	81	0.32	0.40	
BH203	5.52 - 5.66	5	CS	1		MUDSTONE	A	U	Y	37	63	81	2.30	80.6061	0.35	0.44	
BH203	10.83 - 10.92	6	CS			MUDSTONE	D	U	Y	30	85	85	1.00	85	0.14	0.18	Fissured
BH203	10.83 - 10.92	6	CS	1		MUDSTONE	A	U	Y	37	42	85	1.00	67.4201	0.22	0.25	Fissured
BH203	12.32 - 12.44	8	CS			MUDSTONE	D	U	Y	40	85	85	0.50	85	0.07	0.09	Fissured
BH203	12.32 - 12.44	8	CS	1		MUDSTONE	I	U	Y	35	37	65	1.90	55.3366	0.62	0.65	Fissured
BH203	13.80 - 14.00	9	CS			MUDSTONE	D	U	Y	55	85	85	5.00	85	0.69	0.88	
BH203	13.80 - 14.00	9	CS	1		MUDSTONE	A	U	Y	36	54	85	9.00	76.4472	1.54	1.86	
BH203	15.00 - 15.20	10	CS			SILTSTONE	D	U	Y	55	85	85	4.00	85	0.55	0.70	Sample broke along plains of weakness
BH203	15.00 - 15.20	10	CS	1		SILTSTONE	A	U	Y	37	60	85	13.00	80.5824	2.00	2.48	
BH203	16.54 - 16.68	11	CS			MUDSTONE	D	U	Y	55	86	86	2.80	86	0.38	0.48	
BH203	16.54 - 16.68	11	CS	1		MUDSTONE	A	U	Y	30	71	86	2.20	88.1726	0.28	0.37	
BH203	17.87 - 18.00	12	CS			SILTSTONE	D	par	Y	40	80	80	0.30	80	0.05	0.06	Sample broken along parting.
BH203	17.87 - 18.00	12	CS	1		SILTSTONE	A	per	Y	37	47	80	12.00	69.1909	2.51	2.90	
BH203	20.92 - 21.07	14	CS			SILTSTONE	D	U	Y	55	86	86	8.00	86	1.08	1.38	
BH203	20.92 - 21.07	14	CS	1		SILTSTONE	A	U	Y	35	46	86	10.00	70.9714	1.99	2.32	
BH203	23.72 - 23.90	16	CS			SILTSTONE	D	U	Y	50	80	80	7.00	80	1.09	1.35	
BH203	23.72 - 23.90	16	CS	1		SILTSTONE	A	U	Y	35	65	80	11.00	81.3686	1.66	2.07	
BH205	6.50 - 6.60	1	CS			MUDSTONE/SILTSTONE	D	par	Y	38	105	105	0.40	105	0.04	0.05	Laminated

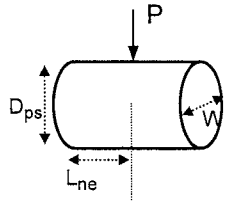
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

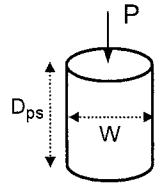
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Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
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L_{ne} - Length from platens to nearest free end
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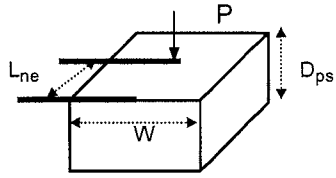
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH205	6.50 - 6.60	1	CS	1		MUDSTONE/SILTSTONE	A	per	Y	45	51	105	4.90	82.5724	0.72	0.90	Laminated
BH205	8.64 - 8.73	2	CS			SILTSTONE	D	U	Y	35	59	59	4.20	59	1.21	1.30	
BH205	8.64 - 8.73	2	CS	1		SILTSTONE	A	U	Y	25	45	59	8.00	58.1416	2.37	2.53	
BH205	12.17 - 12.24	3	CS			SILTSTONE	D	par	Y	30	86	86	0.50	86	0.07	0.09	Contains partings
BH205	12.17 - 12.24	3	CS	1		SILTSTONE	A	per	Y	37	31	86	1.20	58.262	0.35	0.38	Contains partings
BH205	13.13 - 13.28	4	CS			SILTSTONE	D	par	Y	50	86	86	1.80	86	0.24	0.31	Contains partings
BH205	13.13 - 13.28	4	CS	1		SILTSTONE	A	per	Y	38	50	86	5.20	73.9928	0.95	1.13	Contains partings
BH205	16.06 - 16.13	7	CS			SILTSTONE	D	U	Y	35	86	86	11.00	86	1.49	1.90	
BH205	16.06 - 16.13	7	CS	1		SILTSTONE	A	U	Y	38	51	86	10.00	74.729	1.79	2.15	
BH205	20.15 - 20.33	8	CS			SILTSTONE	D	U	Y	50	85	85	12.00	85	1.66	2.11	
BH205	20.15 - 20.33	8	CS	1		SILTSTONE	A	U	Y	35	59	85	12.00	79.908	1.88	2.32	
BH206	7.92 - 8.13	10	CS			MUDSTONE	D	U	Y	70	104	104	0.90	104	0.08	0.12	
BH206	7.92 - 8.13	10	CS	1		MUDSTONE	A	U	Y	50	63	104	1.10	91.336	0.13	0.17	
BH206	9.00 - 9.14	11	CS			MUDSTONE	D	U	Y	51	102	102	2.80	102	0.27	0.37	
BH206	9.00 - 9.14	11	CS	1		MUDSTONE	A	U	Y	48	42	102	3.10	73.855	0.57	0.68	
BH206	11.47 - 11.63	13	CS			MUDSTONE	D	U	Y	50	83	83	3.60	83	0.52	0.66	
BH206	11.47 - 11.63	13	CS	1		MUDSTONE	A	U	Y	35	47	83	3.10	70.4763	0.62	0.73	
BH206	14.42 - 14.65	15	CS			SILTSTONE	D	U	Y	45	86	86	6.00	86	0.81	1.04	
BH206	14.42 - 14.65	15	CS	1		SILTSTONE	I	U	Y	35	50	48	7.00	55.2791	2.29	2.40	
BH206	16.12 - 16.29	17	CS			SILTSTONE	D	par	Y	53	85	85	3.90	85	0.54	0.69	Lamined

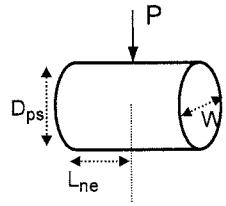
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

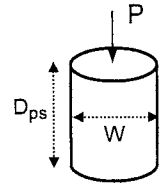
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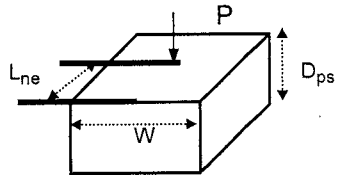
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH206	16.12 - 16.29	17	CS	1		SILTSTONE	A	per	Y	37	62	85	6.00	81.9144	0.89	1.12	Lamined
BH206	17.55 - 17.65	19	CS			SILTSTONE	D	par	Y	45	85	85	3.00	85	0.42	0.53	Laminated
BH206	17.55 - 17.65	19	CS	1		SILTSTONE	A	per	Y	37	57	85	4.50	78.542	0.73	0.89	Laminated
BH206	18.95 - 19.05	20	CS			SILTSTONE	D	U	Y	52	84	84	6.00	84	0.85	1.07	
BH206	18.95 - 19.05	20	CS	1		SILTSTONE	A	U	Y	35	56	84	6.00	77.3907	1.00	1.22	
BH206	19.50 - 19.64	22	CS			SILTSTONE	D	U	Y	45	84	84	8.00	84	1.13	1.43	
BH206	19.50 - 19.64	22	CS	1		SILTSTONE	A	U	Y	37	59	84	10.00	79.4366	1.58	1.95	
BH207	7.26 - 7.50	10	CS			MUDSTONE	D	U	Y	75	106	106	0.30	106	0.03	0.04	
BH207	7.26 - 7.50	10	CS	1		MUDSTONE	A	U	Y	45	62	106	0.40	91.4753	0.05	0.06	
BH207	8.17 - 8.35	11	CS			SILTSTONE/MUDSTONE	D	U	Y	45	59	59	1.90	59	0.55	0.59	
BH207	8.17 - 8.35	11	CS	1		SILTSTONE/MUDSTONE	A	U	Y	25	49	59	3.00	60.6707	0.82	0.89	
BH207	9.10 - 9.25	12	CS			SILTSTONE	D	par	Y	40	59	59	2.00	59	0.57	0.62	Laminated
BH207	9.10 - 9.25	12	CS	1		SILTSTONE	A	per	Y	25	52	59	4.70	62.5004	1.20	1.33	Laminated
BH207	10.22 - 10.35	13	CS			SILTSTONE/MUDSTONE	D	par	Y	20	59	59	0.20	59	0.06	0.06	Laminated
BH207	10.22 - 10.35	13	CS	1		SILTSTONEMUDSTONE	A	per	Y	25	33	59	0.50	49.7895	0.20	0.20	Laminated
BH207	12.95 - 13.13	15	CS			MUDSTONE	D	U	Y	40	106	106	1.10	106	0.10	0.14	
BH207	12.95 - 13.13	15	CS	1		MUDSTONE	A	U	Y	47	59	106	1.40	89.2347	0.18	0.23	
BH207	16.96 - 17.13	16	CS			MUDSTONE	D	U	Y	45	85	85	0.30	85	0.04	0.05	
BH207	16.96 - 17.13	16	CS	1		MUDSTONE	A	U	Y	38	46	85	1.20	70.5575	0.24	0.28	
BH207	17.90 - 18.03	17	CS			MUDSTONE	D	U	Y	55	87	87	2.70	87	0.36	0.46	

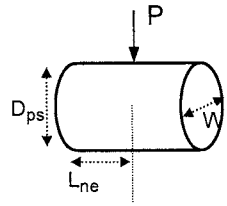
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

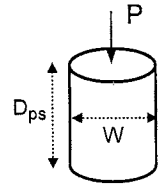
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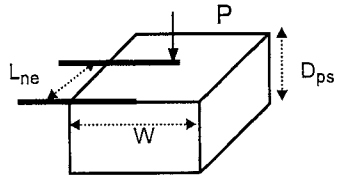
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH207	17.90 - 18.03	17	CS	1		MUDSTONE	A	U	Y	37	74	87	2.20	90.5379	0.27	0.35	
BH207	20.12 - 20.30	19	CS			MUDSTONE	D	U	Y	55	87	87	3.70	87	0.49	0.63	
BH207	20.12 - 20.30	19	CS	1		MUDSTONE	A	U	Y	38	55	87	4.80	78.0542	0.79	0.96	
BH207	21.90 - 22.12	21	CS			MUDSTONE	I	U	Y	38	47	77	4.80	67.8812	1.04	1.20	
BH207	24.80 - 24.90	23	CS			SILTSTONE	D	par	Y	55	86	86	3.10	86	0.42	0.53	Sample failed along plain of weakness
BH207	24.80 - 24.90	23	CS	1		SILTSTONE	A	per	Y	35	67	86	6.00	85.6528	0.82	1.04	
BH207	26.30 - 26.50	24	CS			SILTSTONE	D	U	Y	55	87	87	11.00	87	1.45	1.86	
BH207	26.30 - 26.50	24	CS	1		SILTSTONE	A	U	Y	38	50	87	14.00	74.4217	2.53	3.02	
BH210	8.85 - 9.03	10	CS			SILTSTONE/MUDSTONE	D	U	Y	45	85	85	1.60	85	0.22	0.28	
BH210	8.85 - 9.03	10	CS	1		SILTSTONE/MUDSTONE	A	U	Y	38	55	85	2.30	77.1518	0.39	0.47	
BH210	10.10 - 10.20	11	CS			SILTSTONE/MUDSTONE	D	U	Y	53	86	86	2.70	86	0.37	0.47	
BH210	10.10 - 10.20	11	CS	1		SILTSTONE/MUDSTONE	A	U	Y	35	65	86	4.30	84.3647	0.60	0.76	
BH210	11.40 - 11.56	12	CS			MUDSTONE	D	U	Y	45	86	86	0.90	86	0.12	0.16	
BH210	11.40 - 11.56	12	CS	1		MUDSTONE	A	U	Y	38	60	86	2.80	81.055	0.43	0.53	
BH210	12.10 - 12.31	13	CS			MUDSTONE	D	U	Y	53	86	86	2.60	86	0.35	0.45	
BH210	12.10 - 12.31	13	CS	1		MUDSTONE	A	U	Y	38	60	86	3.50	81.055	0.53	0.66	
BH210	13.20 - 13.35	14	CS			MUDSTONE	D	U	Y	45	83	83	1.20	83	0.17	0.22	
BH210	13.20 - 13.35	14	CS	1		MUDSTONE	A	U	Y	38	48	83	1.20	71.2221	0.24	0.28	
BH210	15.12 - 15.22	15	CS			MUDSTONE	D	par	Y	40	84	84	0.50	84	0.07	0.09	
BH210	15.12 - 15.22	15	CS	1		MUDSTONE	A	per	Y	37	65	84	1.10	83.378	0.16	0.20	

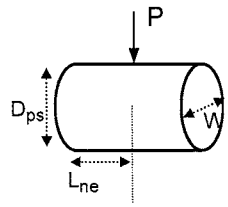
Point Load Index Test
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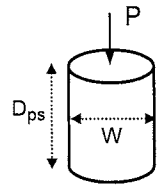
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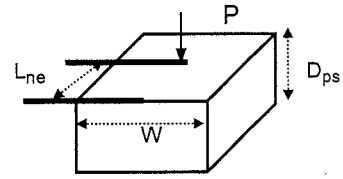
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH210	17.60 - 17.80	16	CS			MUDSTONE	D	U	Y	60	86	86	3.50	86	0.47	0.60	
BH210	17.60 - 17.80	16	CS	1		MUDSTONE	A	U	Y	37	51	86	3.00	74.729	0.54	0.64	
BH210	18.80 - 18.97	18	CS			MUDSTONE	D	U	Y	45	86	86	3.40	86	0.46	0.59	
BH210	18.80 - 18.97	18	CS	1		MUDSTONE	A	U	Y	37	47	86	2.40	71.7387	0.47	0.55	
BH210	19.80 - 20.00	19	CS			SILTSTONE/MUDSTONE	D	U	Y	50	86	86	4.60	86	0.62	0.79	
BH210	19.80 - 20.00	19	CS	1		SILTSTONE/MUDSTONE	A	U	Y	38	61	86	9.00	81.7277	1.35	1.68	
BH210	22.37 - 22.50	21	CS			SILTSTONE/MUDSTONE	D	U	Y	55	86	86	4.70	86	0.64	0.81	
BH210	22.37 - 22.50	21	CS	1		SILTSTONE/MUDSTONE	A	U	Y	37	60	86	7.00	81.055	1.07	1.32	
BH210	23.30 - 23.48	22	CS			SILTSTONE	D	U	Y	55	86	86	3.40	86	0.46	0.59	
BH210	23.30 - 23.48	22	CS	1		SILTSTONE	A	U	Y	38	39	86	6.00	65.3486	1.41	1.58	
BH210	24.38 - 24.50	23	CS			SILTSTONE	D	par	Y	50	86	86	2.40	86	0.32	0.41	
BH210	24.38 - 24.50	23	CS	1		SILTSTONE	A	per	Y	37	52	86	6.00	75.4581	1.05	1.27	
BH210	26.56 - 26.67	25	CS			SILTSTONE	D	par	Y	57	86	86	2.70	86	0.37	0.47	
BH210	26.56 - 26.67	25	CS	1		SILTSTONE	A	per	Y	37	60	86	12.00	81.055	1.83	2.27	
BH210	27.56 - 27.75	26	CS			SILTSTONE	D	U	Y	48	85	85	14.00	85	1.94	2.46	
BH210	27.56 - 27.75	26	CS	1		SILTSTONE	A	U	Y	38	66	85	14.00	84.5155	1.96	2.48	
BH210	30.60 - 30.80	28	CS			SILTSTONE	D	U	Y	49	86	86	11.00	86	1.49	1.90	
BH210	30.60 - 30.80	28	CS	1		SILTSTONE	A	U	Y	37	58	86	11.00	79.6927	1.73	2.14	
BH210	32.10 - 32.20	29	CS			SILTSTONE	D	U	Y	50	86	86	28.00	86	3.79	4.83	
BH210	32.10 - 32.20	29	CS	1		SILTSTONE	A	U	Y	37	53	86	26.00	76.1802	4.48	5.41	

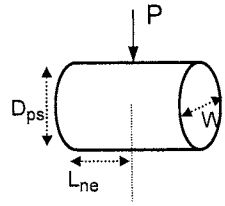
Point Load Index Test
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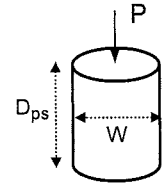
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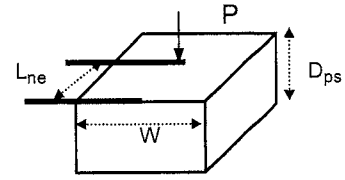
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH211	7.74 - 7.95	1	CS			MUDSTONE	D	U	Y	50	86	86	3.40	86	0.46	0.59	
BH211	7.74 - 7.95	1	CS	1		MUDSTONE	A	U	Y	38	52	86	2.00	75.4581	0.35	0.42	
BH211	8.63 - 8.79	2	CS			MUDSTONE	D	U	Y	23	86	86	0.40	86	0.05	0.07	
BH211	8.63 - 8.79	2	CS	1		MUDSTONE	A	U	Y	37	53	86	0.40	76.1802	0.07	0.08	
BH211	9.20 - 9.30	3	CS			MUDSTONE	D	U	Y	35	86	86	1.80	86	0.24	0.31	
BH211	9.20 - 9.30	3	CS	1		MUDSTONE	A	U	Y	37	44	86	1.70	69.4114	0.35	0.41	
BH211	12.28 - 12.40	4	CS			MUDSTONE	D	U	Y	25	82	82	0.20	82	0.03	0.04	
BH211	12.28 - 12.40	4	CS	1		MUDSTONE	A	U	Y	35	39	82	1.60	63.8108	0.39	0.44	
BH211	13.92 - 14.02	6	CS			SILTSTONE	D	par	Y	48	86	86	1.80	86	0.24	0.31	
BH211	13.92 - 14.02	6	CS	1		SILTSTONE	A	per	Y	38	52	86	9.00	75.4581	1.58	1.90	
BH211	15.82 - 15.92	7	CS			SILTSTONE	D	par	Y	37	81	81	1.80	81	0.27	0.34	
BH211	15.82 - 15.92	7	CS	1		SILTSTONE	A	per	Y	36	36	81	5.00	60.9325	1.35	1.47	
BH211	17.63 - 17.78	8	CS			SILTSTONE	D	U	Y	45	85	85	8.00	85	1.11	1.41	
BH211	17.63 - 17.78	8	CS	1		SILTSTONE	A	U	Y	38	48	85	11.00	72.0751	2.12	2.50	
BH211	18.72 - 18.82	10	CS			SILTSTONE	D	U	Y	40	83	83	10.00	83	1.45	1.82	
BH211	18.72 - 18.82	10	CS	1		SILTSTONE	A	U	Y	37	48	83	5.00	71.2221	0.99	1.16	
BH211	20.68 - 20.81	11	CS			SILTSTONE	D	U	Y	48	84	84	8.00	84	1.13	1.43	
BH211	20.68 - 20.81	11	CS	1		SILTSTONE	A	U	Y	37	60	84	10.00	80.107	1.56	1.93	
BH212	13.60 - 13.75	12	CS			MUDSTONE	D	U	Y	60	101	101	0.40	101	0.04	0.05	
BH212	13.60 - 13.75	12	CS	1		MUDSTONE	A	U	Y	45	66	101	0.50	92.1272	0.06	0.08	

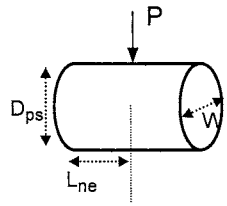
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

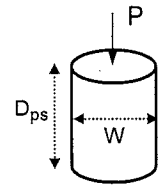
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Test Type
D - Diametral, A - Axial, I - Irregular Lump
Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
D_{ps}' - at failure
L_{ne} - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

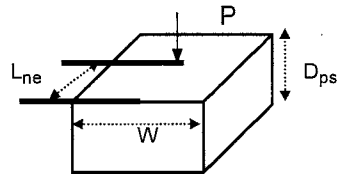
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH212	16.45 - 16.60	13	CS			MUDSTONE	D	U	Y	65	106	106	5.20	106	0.46	0.65	
BH212	16.45 - 16.60	13	CS	1		MUDSTONE	A	U	Y	45	45	106	7.00	77.9317	1.15	1.41	
BH212	19.00 - 19.10	14	CS			MUDSTONE	D	U	Y	55	105	105	4.30	105	0.39	0.54	
BH212	19.00 - 19.10	14	CS	1		MUDSTONE	A	U	Y	47	58	105	5.10	88.057	0.66	0.85	
BH212	20.98 - 21.13	16	CS			SILTSTONE	D	U	Y	57	103	103	4.70	103	0.44	0.61	
BH212	20.98 - 21.13	16	CS	1		SILTSTONE	A	U	Y	46	51	103	7.00	81.7822	1.05	1.31	
BH212	21.84 - 22.05	17	CS			SILTSTONE	D	U	Y	55	104	104	8.00	104	0.74	1.03	
BH212	21.84 - 22.05	17	CS	1		SILTSTONE	A	U	Y	47	62	104	18.00	90.6082	2.19	2.87	
BH212	22.05 - 22.33	18	CS			SILTSTONE	D	U	Y	60	105	105	8.00	105	0.73	1.01	
BH212	22.05 - 22.33	18	CS	1		SILTSTONE	A	U	Y	50	44	105	8.00	76.6966	1.36	1.65	
BH212	23.00 - 23.30	19	CS			SILTSTONE	D	U	Y	60	104	104	16.00	104	1.48	2.06	
BH212	23.00 - 23.30	19	CS	1		SILTSTONE	A	U	Y	47	65	104	22.00	92.7745	2.56	3.38	
BH212	24.40 - 24.58	20	CS			SILTSTONE	D	par	Y	52	104	104	5.00	104	0.46	0.64	
BH212	24.40 - 24.58	20	CS	1		SILTSTONE	A	per	Y	46	55	104	10.00	85.3401	1.37	1.75	
BH212	27.10 - 27.35	22	CS			SILTSTONE	D	U	Y	60	95	95	10.00	95	1.11	1.48	
BH212	27.10 - 27.35	22	CS	1		SILTSTONE	A	U	Y	42	65	95	11.00	88.6694	1.40	1.81	
BH212	28.30 - 28.56	23	CS			SILTSTONE	D	U	Y	58	100	100	4.60	100	0.46	0.63	
BH212	28.30 - 28.56	23	CS	1		SILTSTONE	A	U	Y	45	45	100	8.00	75.694	1.40	1.68	
BH219	14.75 - 15.06	16	CS			MUDSTONE	D	U	Y	50	79	79	1.50	79	0.24	0.30	
BH219	14.75 - 15.06	16	CS	1		MUDSTONE	A	U	Y	35	52	79	1.50	72.322	0.29	0.34	

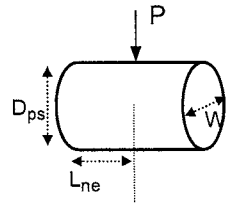
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

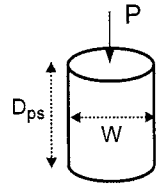
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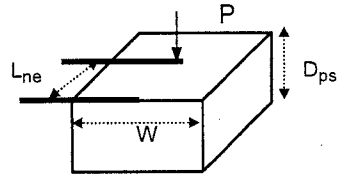
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH219	15.30 - 15.50	17	CS			MUDSTONE	D	U	Y	60	84	84	0.30	84	0.04	0.05	
BH219	15.30 - 15.50	17	CS	1		MUDSTONE	A	U	Y	37	59	84	1.30	79.4366	0.21	0.25	
BH219	18.60 - 18.70	18	CS			MUDSTONE	D	U	Y	55	84	84	2.50	84	0.35	0.45	
BH219	18.60 - 18.70	18	CS	1		MUDSTONE	A	U	Y	35	46	84	3.90	70.1413	0.79	0.92	
BH219	19.50 - 19.60	19	CS			MUDSTONE	D	U	Y	40	82	82	2.10	82	0.31	0.39	
BH219	19.50 - 19.60	19	CS	1		MUDSTONE	A	U	Y	38	37	82	3.00	62.1531	0.78	0.86	
BH219	21.76 - 21.86	20	CS			MUDSTONE	D	U	Y	35	86	86	2.50	86	0.34	0.43	
BH219	21.76 - 21.86	20	CS	1		MUDSTONE	A	U	Y	38	51	86	4.80	74.729	0.86	1.03	
BH219	24.47 - 24.54	21	CS			MUDSTONE	D	U	Y	40	85	85	1.10	85	0.15	0.19	
BH219	24.47 - 24.54	21	CS	1		MUDSTONE	A	U	Y	37	40	85	1.50	65.7952	0.35	0.39	
BH219	25.25 - 25.35	23	CS			MUDSTONE	D	U	Y	50	84	84	1.20	84	0.17	0.21	
BH219	25.25 - 25.35	23	CS	1		MUDSTONE	A	U	Y	38	47	84	2.70	70.8996	0.54	0.63	
BH219	27.85 - 28.00	25	CS			SILTSTONE/MUDSTONE	D	U	Y	50	86	86	3.20	86	0.43	0.55	
BH219	27.85 - 28.00	25	CS	1		SILTSTONE/MUDSTONE	A	U	Y	38	41	86	4.40	67.0033	0.98	1.12	
BH219	29.00 - 29.20	26	CS			SILTSTONE/MUDSTONE	D	U	Y	42	85	85	2.70	85	0.37	0.47	
BH219	29.00 - 29.20	26	CS	1		SILTSTONE/MUDSTONE	A	U	Y	37	49	85	4.70	72.822	0.89	1.05	
BH219	30.23 - 30.34	27	CS			SILTSTONE	D	U	Y	50	84	84	3.90	84	0.55	0.70	
BH219	30.23 - 30.34	27	CS	1		SILTSTONE	A	U	Y	37	51	84	4.10	73.855	0.75	0.90	
BH219	32.63 - 32.74	29	CS			SILTSTONE	D	U	Y	50	81	81	11.00	81	1.68	2.08	
BH219	32.63 - 32.74	29	CS	1		SILTSTONE	A	U	Y	35	60	81	10.00	78.6635	1.62	1.98	

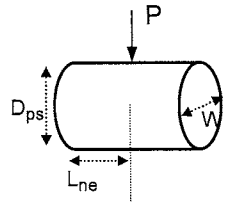
Point Load Index Test
ISRM:1985

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

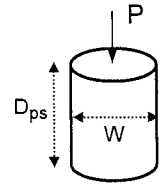
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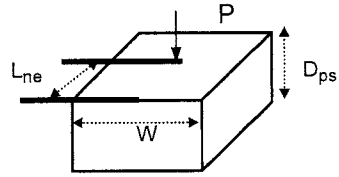
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			LOAD P	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)^{0.45}$		Remarks
							Type (D, A, I)	Direction (Par/Per/U)		Lne mm	Dps' mm	W mm	kN		I_s	$I_{s(50)}$	
BH219	33.75 - 33.87	30	CS			SILTSTONE	D	U	Y	55	83	83	9.00	83	1.31	1.64	
BH219	33.75 - 33.87	30	CS	1		SILTSTONE	A	U	Y	37	67	83	11.00	84.1456	1.55	1.96	
BH219	35.96 - 36.05	31	CS			SILTSTONE	D	U	Y	40	81	81	10.00	81	1.52	1.89	
BH219	35.96 - 36.05	31	CS	1		SILTSTONE	A	U	Y	35	49	81	7.00	71.0879	1.39	1.62	
BH220	7.10 - 7.28	3	CS			MUDSTONE	D	U	Y	45	84	84	1.00	84	0.14	0.18	
BH220	7.10 - 7.28	3	CS	1		MUDSTONE	A	U	Y	37	50	84	1.20	73.1273	0.22	0.27	
BH220	11.53 - 11.65	5	CS			MUDSTONE	D	U	Y	45	84	84	2.00	84	0.28	0.36	
BH220	11.53 - 11.65	5	CS	1		MUDSTONE	A	U	Y	37	43	84	2.20	67.8155	0.48	0.55	
BH220	13.43 - 13.59	6	CS			SILTSTONE	D	U	Y	46	83	83	7.00	83	1.02	1.28	
BH220	13.43 - 13.59	6	CS	1		SILTSTONE	A	U	Y	35	59	83	15.00	78.9624	2.41	2.95	

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK - SUMMARY OF RESULTS

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

Hole No.	Sample				Rock Type	Specimen Dimensions[2]			Bulk Density[2]	Water Content[1]	Uniaxial Compression[3]				Remarks
	No.	Depth (m)		type		Dia.	Height	H/D			Load Rate	Time to failure	Mode of failure	UCS	
		from	to			mm	mm		Mg/m^3	%	kN/min	secs		MPa	
BH201	13	15.82	16.06	CS	SILTSTONE	82.9	189.8	2.3	2.51	3.5	30	523	AC	52.5	Outside ISRM. Contains partings.
BH201	14	23.05	23.45	CS	MUDSTONE	84.8	234.8	2.8	2.54	3.1	20	103	AC	8.7	
BH201	16	25.80	26.13	CS	MUDSTONE	85.2	238.1	2.8	2.6	2.9	20	364	AC	22.5	
BH201	19	34.95	35.22	CS	MUDSTONE	84.2	234.8	2.8	2.61	2.5	20	253	AC	16.0	
BH202	4	10.00	10.35	CS	SILTSTONE	84.7	243.9	2.9	2.58	3.4	20	220	AC	15.3	
BH202	7	16.66	16.90	CS	MUDSTONE	86.2	199.6	2.3	2.55	3.8	10	136	AC	6.3	Outside ISRM Specification. Fissured.
BH202	10	20.27	20.45	CS	MUDSTONE	86.4	168.7	2.0	2.61	3	10	591	AC	20.0	Outside ISRM Specification.
BH202	12	22.57	22.82	CS	SILTSTONE	86.4	231.4	2.7	2.48	4.8	20	1115	AC	69.2	
BH202	15	26.70	26.97	CS	SILTSTONE	86.5	234.9	2.7	2.54	3.8	40	524	F	64.8	
BH203	4	4.00	4.22	CS	SILTSTONE/ MUDSTONE	83.3	185.9	2.2	2.58	3.5	10	538	AC	17.3	Outside ISRM Specification.
BH203	7	11.10	11.40	CS	MUDSTONE	85.7	171.3	2.0	2.55	3.9	10	179	AC	5.6	Outside ISRM Specification.
BH203	13	18.93	19.22	CS	SILTSTONE	83.7	219.3	2.6	2.5	4.6	30	206	AC	20.5	
BH203	15	21.07	21.40	CS	SILTSTONE	85.7	235.1	2.7	2.5	4	20	1055	F	61.9	
BH205	9	9.90	10.32	CS	SILTSTONE	59.5	171.6	2.9	2.38	2.7	20	391	AC	53.7	
BH205	5	13.35	13.70	CS	SILTSTONE	86.0	244.2	2.8	2.53	3.9	40	198	AC	26.9	Contains partings.
BH205	6	15.75	16.06	CS	SILTSTONE	86.2	246.4	2.9	2.44	4.5	30	501	F	47.5	
BH206	12	10.12	10.54	CS	MUDSTONE	85.8	246.8	2.9	2.58	3.1	30	217	AC	18.9	
BH206	14	13.90	14.22	CS	SILTSTONE	83.5	223.4	2.7	2.46	5.3	20	701	AC	44.6	Fissured.
BH206	16	15.75	15.96	CS	SILTSTONE	83.1	178.3	2.1	2.45	5.1	20	1013	AC	63.2	Outside ISRM Specification.
BH206	18	16.80	17.00	CS	SILTSTONE	83.8	220.6	2.6	2.57	3.4	30	177	AC	16.7	
BH206	21	19.23	19.47	CS	SILTSTONE	84.1	215.8	2.6	2.45	4.9	30	517	AC	47.6	
BH207	14	12.14	12.44	CS	MUDSTONE	104.8	193.6	1.8	2.62	3.5	10	976	AC	19.4	Outside ISRM Specification.
BH207	18	18.73	19.05	CS	MUDSTONE	86.7	241.9	2.8	2.57	2.7	20	250	AC	15.1	
BH207	20	20.30	20.58	CS	MUDSTONE	86.6	244.0	2.8	2.6	2.5	15	205	AC	9.9	
BH207	22	23.10	23.50	CS	SILTSTONE	85.5	236.1	2.8	2.5	3.7	25	872	AC	65.1	
BH207	25	27.20	27.56	CS	SILTSTONE	86.7	248.4	2.9	2.47	5.1	40	419	AC	48.8	

Notes : Test Specification : International Society for Rock Mechanics (ISRM), Rock Characterization Testing and Monitoring, Suggested Methods, 1981

1 ISRM p83 test 1, water content at 105 ± 3 °C, specimen as received at the laboratory

2 ISRM p83 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p113 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear MS - multiple shear

AC - Axial cleavage F - Fragmented

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK - SUMMARY OF RESULTS

Project No	Project Name
A8017	BARNSLEY MARKET PHASE 2

Hole No.	Sample				Rock Type	Specimen Dimensions[2]			Bulk Density[2]	Water Content[1]	Uniaxial Compression[3]				Remarks
	No.	Depth (m)		type		Dia.	Height	H/D			Load Rate	Time to failure	Mode of failure	UCS	
		from	to			mm	mm		Mg/m^3	%	kN/min	secs		MPa	
BH210	9	7.43	7.80	CS	MUDSTONE	85.7	224.8	2.6	2.39	7	0.2	199	AC	0.1	
BH210	17	17.80	18.10	CS	MUDSTONE	85.8	241.4	2.8	2.57	2.8	20	154	AC	9.7	
BH210	20	21.20	21.60	CS	SILTSTONE/ MUDSTONE	86.0	249.7	2.9	2.61	2.8	10	1044	AC	30.5	
BH210	24	24.90	25.23	CS	SILTSTONE	85.7	249.8	2.9	2.58	3	30	420	AC	37.7	
BH210	27	29.10	29.54	CS	SILTSTONE	86.2	251.6	2.9	2.45	5.2	30	695	F	60.2	
BH211	5	13.00	13.40	CS	SILTSTONE	82.0	235.7	2.9	2.47	4.4	20	1142	F	73.2	
BH211	9	18.33	18.56	CS	SILTSTONE	84.5	218.6	2.6	2.56	3.9	30	697	AC	63.3	
BH212	15	19.78	20.05	CS	MUDSTONE	104.3	255.5	2.4	2.57	2.8	30	276	AC	16.6	Outside ISRM Specification.
BH212	21	25.76	26.08	CS	SILTSTONE	106.0	263.3	2.5	2.43	4.8	50	601	AC	57.6	Outside ISRM Specification.
BH212	24	30.64	31.05	CS	SILTSTONE	100.6	259.8	2.6	2.45	5	50	438	AC	46.6	
BH219	22	24.80	25.02	CS	MUDSTONE	83.7	214.6	2.6	2.55	3	20	123	AC	9.0	
BH219	24	26.94	27.20	CS	SILTSTONE/ MUDSTONE	83.8	229.0	2.7	2.56	2.6	15	779	AC	36.1	
BH219	28	30.93	31.23	CS	SILTSTONE	84.1	237.7	2.8	2.46	4.8	30	567	F	52.4	
BH220	4	9.31	9.56	CS	MUDSTONE	82.7	235.7	2.9	2.5	4.4	2	315	AC	1.8	
BH220	7	14.52	14.85	CS	SILTSTONE/ MUDSTONE	81.9	237.2	2.9	2.55	3.3	15	501	AC	24.7	

Notes : Test Specification : International Society for Rock Mechanics (ISRM), Rock Characterization Testing and Monitoring, Suggested Methods, 1981

1 ISRM p83 test 1, water content at 105 ± 3 °C, specimen as received at the laboratory

2 ISRM p83 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p113 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear MS - multiple shear

AC - Axial cleavage F - Fragmented